

BEARS

Through the Seasons



American Black Bear

MDC
DISCOVER
nature
SCHOOLS



Kindergarten
Teacher Guide

BEARS

Through the Seasons

Kindergarten Teacher Guide





Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180
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Discover Nature Schools

If children are to keep their inborn sense of wonder, they need the companionship of at least one adult who can share it, rediscovering with them the joy, excitement, and mystery of the world we live in.
— Rachel Carson

Discover Nature Schools (DNS) is the nature-based, inquiry-centered curriculum offering of the Missouri Department of Conservation (MDC) meant to foster awareness, knowledge of, and appreciation for the natural world, all through a Missouri-centered lens. DNS offers instructional units for preschool through high school and is available to schools at no cost to the district. Beyond conservation content, DNS curriculum units are designed to address the Missouri Learning Standards (MLS) as well as the Next Generation Science Standards (NGSS).

Founded on place-based and experiential learning, the instructional strategies and student activities contained in the DNS curriculum are designed to foster outdoor exploration and nature appreciation while simultaneously addressing all the MLS and the NGSS. While primarily addressing science standards, cross-curricular connections and differentiated instructional extensions are features that take a wholistic instructional approach to nature-based education.

Each instructional unit includes a comprehensive teacher guide and student guide, as well as free professional development and educational support from MDC conservation educators.



The MDC Teacher Portal Serves Missouri Educators



Instructional units are available to all Missouri educators in print and on the *MDC Teacher Portal* at education.mdc.mo.gov. Through grants, DNS supports school districts' adoption of each curriculum by offering both transportation reimbursements and educational materials. Contact your local MDC conservation educator at mdc.mo.gov/contact-engage to request more information regarding DNS grant opportunities, educator workshops, and trainings.

Companion Student Guide

The *DNS Kindergarten Teacher Guide* is designed to accompany the *DNS Kindergarten Student Guide*. The student text is designed for multifaceted functionality as a nonfiction text, student reader, and student science notebook, all in one comprehensive book.

The *DNS Kindergarten Teacher Guide* features teacher prompts to direct students to corresponding student text at applicable instructional times throughout individual lessons and prompts to utilize science notebook portions of the student guide.

The *DNS Kindergarten Student Guide* contains nonfiction text for student reading that supports teacher instruction, cross-curricular components, and features such as:

- *Exploring the Phenomenon* — Introduces the unit-anchoring phenomenon.
- *Read Together* — Targeted kindergarten-appropriate nonfiction text that introduces the phenomenon.
- *Talk About It* — Promotes classroom engagement and recall of prior knowledge.
- *Fun Fact* — Missouri-specific facts supportive of lesson objectives.
- *Draw It!* — Promotes early science notebook recording skills.
- *Science Notebook* — Introduces students to science notebooks that can also serve as ongoing formative assessment.

Taking Activities Outside

Most learning experiences in the DNS Kindergarten Edition are designed to be implemented outside in the schoolyard or contain an outdoor exploration component to be carried out during the lesson. It is also recommended for educators to be mindful of possible challenges students might encounter in specific outdoor environments. Teachers are urged to become familiar with their district's outdoor area, schoolyard, or outdoor classroom area, making note of ideal learning environments. Examples can include places such as trees and green areas away from roads. Each time outdoor learning is conducted, educators should view the outdoor learning space as an extension of the indoor classroom, with all indoor student expectations still observed in the outdoor environment. By keeping the learning experience in mind, educators can anticipate what children might encounter to support instruction. While outdoor learning environments do require a little more initial preparation, the rewards are plentiful, and engagement is multiplied.

Appropriate Attire

Ensure children are appropriately attired for the type of exploration in which you plan to engage. It is recommended, prior to starting DNS units, to send home parent or family letters outlining the type of outdoor activities students will be engaged in throughout the seasons so parents can properly attire their children. Consider and anticipate weather and forecasts prior to outdoor learning experiences. While weather extremes should be avoided, much can be learned through brief observations in mildly fluctuating conditions. Going outdoors during light snowfall, moments after a rain shower, and in windy conditions may require a bit more preparation but can serve as very teachable moments and offer unique and subtle changes to the fair-weather environment that students are primarily familiar with.

Appropriate Tools

It is recommended that educators gather materials needed for the outdoor experience prior to engagement. This can be as simple as having a classroom tote, bucket, or backpack specifically used for outdoor explorations. Possible items for inclusion

are: class thermometers, pencils, insect collection containers, magnifiers, rulers, first-aid kits, and clipboards. Remember to have students bring their student guides to record observations.

New Learning Environments

Exploring unfamiliar phenomena is fun and engaging. Teachers don't need to have all the answers. As Rachel Carson so wisely noted, young children (and scientists) have an inborn sense of wonder. Through outdoor exploration, educators can focus on appealing to a child's sense of wonder and curiosity rather than concentrating on knowledge acquisition. As children broaden their curiosity of the natural world, they will learn to apply that knowledge to real world situations.

Explorations

Encourage children to be observant. Many of the learning experiences offered encourage children to explore using their senses. Teachers can model how to observe, sketch, and record data about phenomena as outdoor learning advances throughout the year. As educators model and encourage students to assume the roles of nature artists and scientists, they set an educational precedent that promotes inquiry and exploration of the unknown rather than apprehension of not having all the answers. A sense of wonder generally comes with a quest to find all the answers in the process. By bringing the observation to the child's developmental level, educators can sway the instinctive urge of wanting to know all the answers by focusing on exploration of color, size, shape, texture, or smells rather than always providing facts.

Sharing Learning Events with Children

Teacher attitude and approach are as important as the activities themselves in sharing the learning experiences presented in this teacher guide. In his book *Childhood and Nature: Design Principles for Educators*, David Sobel (2008) identifies seven childhood "play motifs." He uses these play motifs to construct design principles for helping children build relationships with nature.

Recognizing and using these design principles helps you shape student experiences that are positive and

engaging. You can explore the unknown and the joy of learning along with your students while keeping in mind the outcomes outlined by learning standards.

1. **Adventure** — Adventure involves risk taking, exploration of the unknown, and surprises. Remember to set the stage for adventure as you explore the experiences with your students. Adopting a small change in language and tone of voice used to introduce an experience to children can make the learning fun and purposeful.
2. **Fantasy and Imagination** — Engage the child's imagination and encourage him or her to "live the challenge" rather than merely hearing about it. Use the experiences in this guide to create worlds for students to imagine and explore while also accomplishing the tasks designated by Missouri Learning Standards (MLS). Standards guide our teaching and ensure a certain level of knowledge. Engage your imagination and that of the student's and everyone will remember the material you want them to learn.
3. **Animal Allies** — "Animals play a significant role in the evolution of children's care about the natural world and in their own emotional development," Sobel wrote. The best way to understand something is to become that thing — to live, breathe, and play as the animal or plant. Within this teacher guide, you will find activities that assist you in helping children to experience the live action of Missouri's wildlife. Students are much more inclined to remember through firsthand exploration rather than just reading about it. Through these types of experiences, children really grasp the plant's or animal's role in the ecosystem.
4. **Maps and Paths** — This extends the spirit of adventure and exploration by encouraging the discovery of following a trail around the next bend; it builds anticipation and encourages delayed gratification. Maps allow students to understand their space in new ways. Using both maps and paths will allow students the opportunity to focus on sense of place.
5. **Special Places** — These are places we all seek to find comfort. Very young children will find these

locations within their home. As children grow, special places expand to outside areas. You can encourage students to find special places within their schoolyard, backyard, and neighborhood.

6. **Small Worlds** — This allows students to bring the world to their own scale. Fairy houses, toy trains, and doll houses are perfect examples. Focusing on the miniature and seeing the world through the eyes of an ant, for example, encourages students to slow down and look more closely. Through this smaller lens, students will begin to understand the bigger picture.
7. **Hunting and Gathering** — It is natural to collect natural items when outside. This is part of the human experience. Use these gathered items to look for patterns, sort, classify, and create. These collections provide a natural way to extend learning. The scavenger hunt is an extension of inquiry and can provide opportunity for further investigation. Encourage students' natural curiosity and allow that to drive learning as appropriate.

Teachable Moments

Take advantage of teachable moments. These are times when a child or a group of children has expressed an interest in an object or when an outdoor phenomenon unexpectedly presents itself. Seize the opportunity and expand upon the expressed interest — it may even be a fleeting phenomenon, such as a fluttering monarch that children view only briefly. Focus need not only be on the investigative phenomenon of individual lessons, but rather investigative phenomenon coupled by those fleeting phenomena and teachable moments.

Collections

Encourage children to explore with their eyes rather than disturbing areas or collecting specimens. While there are appropriate opportunities for specimen collection, many occasions allow for the observation of, rather than collection of, specific outdoor educational finds. After specimens have been examined, remember to return leaf litter and rotting logs to where they were found. However, collecting items from nature — like leaves, twigs,

feathers, or rocks — and taking them back to the classroom is a wonderful way to extend the outdoor experience when appropriate. Many of the learning experiences included in this teacher guide suggest collecting specific items from nature for observation in the classroom. Use the following guidelines when promoting collection as part of the learning experience.

1. **Discuss safe and specific items to collect.** Often children are very zealous in their collection process. They neglect to consider safety. Be sure to discuss what the children are collecting and how to make sure it is something safe before collection begins.
2. **Respect the area and all area regulations.** If you are exploring a locale beyond your school yard, read and follow the rules of the area. Discuss with the children the benefits of only taking items needed for specific investigative purposes. Other finds should be left behind for other users of the habitat to enjoy. Discuss wise use of the natural resource and the impact the children might have on the area. For example, when children collect seeds or nuts, collecting every acorn found might deprive the local wildlife of a food source. When collecting flowers, it is best to follow the “1:10 rule” meaning for every 10 of the same flower or item found, pick one. This will leave the opportunity for that organism to continue to reproduce.
3. **Consider alternative methods of collection when appropriate.** Collecting items from nature doesn’t always require the physical removal of the item. Photographs and sketches are alternatives, but audio recordings of sounds can also be a valuable reminder of the experience for children. Listening to these audio or video recordings in the classroom often allows children (and teachers) to notice details missed while in the area.
4. **Live plants and animals encountered during an outdoor learning event should be observed in the natural habitat, then released immediately.**

Plants and animals held in captivity can be exposed to harmful diseases, viruses, and fungi that might be transferred to wild native species. As an alternative, consider building animal habitats such as a small pond or collection of native plants and grasses in your schoolyard that will attract species for student observation.

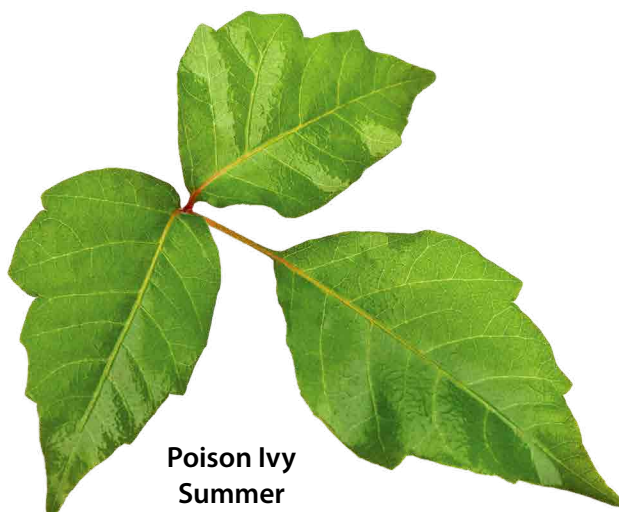
5. **Do not release purchased species, such as tadpoles, insects, or nonnative plants into the wild.** This applies to nonnative classroom animals as well. If you purchase crickets for the Chirping Crickets activity, you need to ensure they are not released into your schoolyard. Many of these purchased species are not native to Missouri and can create difficulties for native species, disrupting local ecosystems. *The Wildlife Code of Missouri* prohibits the release of certain species. Several invasive and exotic species around the country have been traced back to school project releases.
6. **Bird parts, such as feathers, nests, and eggs, are wonderful items from nature to study and use in the classroom, but caution should be used, and knowledge of federal laws is encouraged.** All bird-related items found outdoors may be examined and left where they were found. The Migratory Bird Treaty Act (MBTA) of 1918 prohibits the possession, purchase, sale, transport, etc., of any migratory bird and prohibits possession of any bird part, nest, or egg of any such bird. To legally possess feathers of birds protected by MBTA, contact a conservation agent with Missouri Department of Conservation for assistance with obtaining the federal educational use permit which must remain with the specimen. Feathers and other bird-related items from legally harvested game birds such as turkey, doves, quail, and waterfowl may be legally possessed without permit. Other bird species, including house sparrow, European starling, and rock pigeon, are introduced species, are not protected under MBTA or state law. Bird-related items from these species may be legally possessed without permit. Also, bird-related items

from farm-raised species may be legally possessed as well as those purchased from classroom supply or hobby retail sources.

7. **Poison ivy is common throughout the state, as are other unpleasant species such as stinging nettle. These plants should be avoided by students.** Learn to recognize such examples and note the location on the school grounds. Educators are urged to share photos of such species as well as photos of their leaves in different seasons to allow students to become familiar with and avoid them.

The following song to the tune of *Yankee Doodle* will help your students remember what to look for and encourage them to see the purpose poison ivy serves in nature:

*Poison ivy has three leaves.
White berries grow upon it.
It is food for birds and deer, but people
should not get near.
Poison ivy — leaves of three.
Poison ivy — let it be.
Bush or vine, do not touch it,
Unless you want to itch, itch, itch.*



Poison Ivy
Summer



Poison Ivy
Fall

Key References

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How to Use This Guide

Unit Standards, Pacing, and Components

This teacher guide is divided into four seasonal instructional units. Each unit contains an introduction page in the student guide with unit-anchoring phenomena as well as investigative phenomena for each individual lesson. Each unit also contains a timeline to allow for pacing of content, vocabulary lists, *Lessons at a Glance* organizers, and essential questions as well as related reading text to support unit content. The introduction of each unit lists which Missouri Learning Standards (MLS), Next Generation Science Standards (NGSS), and Cross-Curricular Standards will be covered in the lessons.

A Note on Phenomena

Phenomena are natural events that happen in the world around us. In phenomena-based learning, these natural events serve as the foundation for engaging students and allow them to apply their learning to the real world. Studying phenomena motivates students to develop questions and promotes the drive for inquiry-based learning. This directed learning provides students a way to apply the science concepts they are learning in tangible ways as they form new science ideas. Teachers should continually return to the phenomena as students develop deeper understanding. This approach makes learning more meaningful and more fully engages students as they learn scientific concepts.

5E Model of Instruction

This teacher guide uses the 5E instructional organization model to guide instruction and inquiry. This lesson sequencing includes five phases of learning and instruction: **Engage, Explore, Explain, Elaborate**, and **Evaluate**. This method provides a carefully plotted sequence of instruction that places students directly in the center of the learning experience. In each phase of the 5E model, teachers allow for evidence collection and information acquisition centered around an investigative phenomenon. This guide also includes prompts at many phases of the 5E model with specific teacher-directed questions and open-ended statements. Through this model prior knowledge is captured, future questions or “wonderings” are explored, and students proceed

through a naturally guided learning continuum that harnesses their inquisitive nature. Students learn to ask questions, observe, analyze, explain, draw conclusions, and provide reasoning for arguments based on evidence acquired throughout the lessons.

Noticings and Wonderings Chart

This guide provides a *Noticings and Wonderings Chart* for teachers to use throughout the lesson. A *Noticings and Wonderings Chart* is a graphic organizing tool to help a teacher guide their students in progression throughout the lesson. It is based on the constructivist teaching methodology in which students’ knowledge about the phenomenon is activated and built upon. It is a tool that allows the input of student ideas by topic within different parts of the 5E Model of Instruction. It also serves as a tool to help drive instruction throughout the lesson and unit with the collection of student experiences as the lesson progresses.

The *Noticings and Wonderings Chart* can be used in correlation with the well-known graphic organization tool of a KWL chart where the following is delineated:

- **Know** — What do we already know about this phenomenon?
- **Want to Know** — What do we want to know about this phenomenon?
- **Learned** — What have we learned about this phenomenon?

The *Noticings and Wonderings Chart* provides prompts throughout the lesson for teachers to record student answers (to be recorded under the corresponding column) regarding lesson phenomenon to the following questions:

- **Noticings** — What do you NOTICE or observe about the phenomenon? This section is meant to grow throughout the lesson.
- **Wonderings** — What do you WONDER about the phenomenon being observed? What further questions do you have?

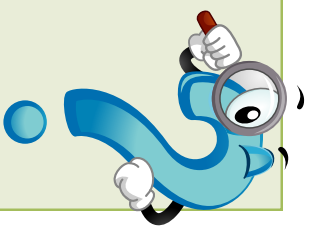
It is recommended that you fill out the chart as a group and display it at the front of the classroom for the duration of the lesson. It is helpful to revisit the chart as the unit progresses to track learning, especially if lesson concepts (such as tracking weather data and seasonal changes) are reviewed and concepts are scaffolded.

What I
Notice...



What do you see?

What I
Wonder...



What questions do you have?

Student Guide and Science Notebook Pages

Notebooks are used by scientists to record data, observations, sketches, and drawings and a tool to review past data entries to compare results. They are different from a journal, which may be simply a record of thoughts, observations, and reflections. They can also be more than a science log that only contains data. Science notebooks are also an extremely useful tool in the process of teaching and learning science for students and teachers alike. Activities in this teacher guide encourage students to:

1. Organize and record observations that correlate to the phenomenon studied.
2. Compare, collaborate, discuss, and share their observations and data collected with other students.
3. Review their entries across different seasons to document changes.
4. Maintain ongoing records of all their classroom and small group discussions and observations, so that they may review them throughout the unit.

In this way, the Science Notebook pages provide opportunities for students to apply similar authentic practices employed by scientists. They promote good data collection and record-keeping habits and serve as a valuable reference. Students begin to recognize the Science Notebook pages as useful resources for documentation and begin to understand the necessity of recording data, especially if the data is referenced later in the year. For teachers, the Science Notebook pages provide ample opportunity for formative assessment of student work and data organization as well as mastery of content and skills, and they also serve to guide the students' learning process.

For use with the Discover Nature Schools Kindergarten Unit, student guides are provided for each student. Students will be required to use their student guides with the Science Notebook pages for most activities for field study, data collection, and organization. Most Science Notebook pages provide templates needed for specific activities from the teacher guide.

Individual Lessons and Units

This teacher guide comprises four units, each containing activities that address individual standards and investigative phenomenon. Units are groupings of lessons that address similar standards. This allows for extended opportunities for meaningful and deep learning. The investigative phenomenon may change slightly as students complete the lessons, but the phenomenon is always associated with the MLS and NGSS that is addressed. Individual flexibility on scope and sequence is at the discretion of the educator, though lesson groupings are a suggested use meant to serve as a pacing and sequencing model.

Kindergarten Lesson Components

See Lesson Overview example on pages 14–15.

Each lesson includes the following components:

- MLS and NGSS Lesson Standards with Three-Dimensional Learning Components
- Investigative Phenomenon
- Materials List
- Cross-Curricular Extensions — Each lesson may extend in one or several domains such as Math, Art, Music, English, Social Skills, Health, or Physical Education
- Take It Home — A section specific for friends and family to become involved in your students' learning
- Student Guide Thumbnail Pages

Teacher Background for Units: Summer, Fall, Winter, and Spring

Black bears have had a long, complicated history in Missouri. Once plentiful, they were nearly gone from the state by the early 1900s. Black bears have slowly returned since that time, with population estimates between 540–840 as of 2020. The Missouri Department of Conservation has created a Missouri Black Bear Story Map that is easily integrated into your classroom lessons. Today, Missouri's black bear population is increasing, and it is found mostly south of the Missouri River. To find the most current population estimates, visit the Missouri Black Bear Project on the *MDC Teacher Portal's* Kindergarten section. While you're there, browse the Bear Story Map for population range and black bear natural history information.

For a listing of additional online resources for all Kindergarten units and the corresponding lessons, visit education.mdc.mo.gov/Kindergarten.

Kindergarten Unit Phenomena and Storyline

A storyline revolving around Missouri black bears and other Missouri animals is woven into the kindergarten curriculum to engage young learners with relevant standards.

Storyline: The southern half of Missouri has millions of acres of bear habitat that is meeting the needs of the bears for them to survive and prosper in our state. Bears do not live in all areas of Missouri; they live in specific ecosystems that meet their needs. Other plants and animals have unique needs that are also met in Missouri in a variety of ecosystems. Daily weather has seasonal patterns which impact plant and animal life. Plants and animals react to seasonal changes in a variety of ways to survive.

Essential Questions and Statements

As a variation of Essential Questions for each unit, this resource also provides Essential Statements that illustrate understanding of Missouri State Standards and student learning expectations.

Essential Question: *How do bears meet their needs throughout the year?*

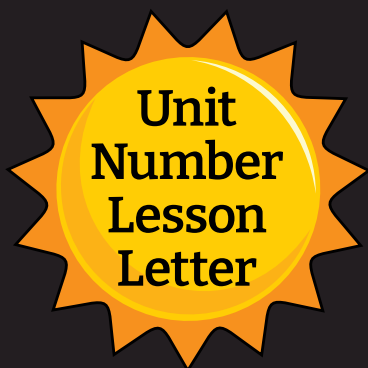
Essential Statement: *I can identify the different needs of black bears and how those needs change through the year.*

Essential Question: *How do Missouri plants and animals meet their needs throughout the year?*

Essential Statement: *I can identify the needs of Missouri plants and animals and how those needs change through the year.*

Essential Question: *How do weather patterns and seasons affect plants and animals?*

Essential Statement: *I can identify the seasonal changes through the year and how these changes affect Missouri plants and animals.*



Lesson Overview



Investigative Phenomenon

The guiding question for the lesson that engages students in a new scientific concept. Students should be able to answer the Investigative Phenomenon by the end of the lesson.



Estimated Time

Estimated time frame to complete each lesson component within the 5E model. The pencil icon indicates additional periods of observation and data collection.

Missouri Learning Science Standard		Next Generation Science Standard	
Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)	



List of Materials

Items needed to teach this lesson.



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

Needed digital materials that are available through the *MDC Teacher Portal*. Follow the link above to access all items from this list. Digital materials may need to be printed for classroom use.

Engage



Spark students' interest and engage their curiosity. Teachers gauge students' prior knowledge as the students share their experiences and express their initial understanding. This is a quick, 5- to 10-minute activity, discussion, or introduction.

Explore



Provide hands-on experiences as students create schema and begin building personal understanding through discovery.

Explain



Help students as they learn the vocabulary to express their new ideas and thinking. Teachers provide support for recognizing cause and effect, patterns, and other science understanding while students process their experiences. Students show their learning through discussion, skills, and reflections.

Elaborate



Give students the chance to expand their understanding to similar situations. They connect concepts in new applications through hands-on learning.

Evaluate



Includes opportunities for student reflection through formative assessment tasks. Often these tasks are completed in the student guide to reference in later lessons and further scaffold learning throughout the curriculum.

Cross-Curricular Extensions

Each lesson may extend in one or several domains such as Math, Art, Music, English, Social Skills, Health, or Physical Education.



Take It Home

A section specific for friends and family to become involved in your students' learning.

What I Notice...
What do you see?

What I Wonder...
What questions do you have?

Reference Page 11 or
MDC Teacher Portal
for template.

1A Signs of Summer

What I Notice...
What do you see?

What I Wonder...
What questions do you have?

What do I do and see in summer?

BEARS Through the Seasons | Kindergarten Student Guide

Draw It!

Draw things you might see in summer.

MDC Discover Nature Schools

Take It Home

Dear Family,

Your child is learning about temperature. Explore your neighborhood with your child and consider the following questions.

Which area feels the coolest?
Which area feels the warmest?
Which areas are the sunniest?
Which areas have the most shade?

Sincerely,

Your Kindergarten Teacher

Take It Home

Dear Family,

Your child is learning about temperature. Explore your neighborhood with your child and consider the following questions.

Which area feels the coolest?
Which area feels the warmest?
Which areas are the sunniest?
Which areas have the most shade?

Sincerely,

Your Kindergarten Teacher

Find MDC Teacher Portal resources at education.mdc.mo.gov/Kindergarten

Missouri Learning Standards and Next Generation Science Standards Lesson Alignment Chart

Missouri Department of Conservation strives to connect its students and teachers to Missouri-based conservation topics and skills. With this in mind, MDC is committed to creating a Discover Nature Schools Kindergarten Unit that can be used to represent all science domains within the Missouri Learning Standards including: Physical Science, Life Science, Earth and Space Science, and Engineering and Technology Science. This curriculum addresses all 14 Kindergarten Performance Expectations outlined within the Missouri Learning Standards (MLS), as well as all 13 Kindergarten Performance Expectations within the Next Generation Science Standards (NGSS). The creation of this curriculum unit was completed by educational professionals in several capacities from Missouri, including district curriculum coordinators, teachers, and MDC conservation educators. Great care has been taken to offer this product as a resource for teachers to replace or supplement a school-year science curriculum, depending on school and teacher needs.

See pages 20–27 for charts for Unit lessons.

3D Model of Learning at a Glance

The Missouri Department of Conservation recognizes the importance of using the three-dimensional learning components to drive proficiency in science across all grade levels. Each lesson outlines the different components: Science and Engineering Practices (SEP), Disciplinary Core Ideas (DCI), and Crosscutting Concepts (CCC) to develop a well-rounded inquiry and evidence-based lesson. The specific performance expectation is bolded for Primary School (K–2) as it applies to each practice, core idea, or concept. You will find these performance expectations scattered within the lessons as you progress through the DNS Kindergarten Unit. Each lesson highlights the specific SEP, DCI, and CCC addressed.

For more detail related to the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts, visit the NGSS Hub at ngss.nsta.org.

Science and Engineering Practices (SEP)

Asking Questions and Defining Problems

Primary School (K–2): Asking questions and defining problems in K–2 builds on prior experiences and progressed to simple descriptive questions.

Developing and Using Models

Primary School (K–2): Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Planning and Carrying Out Investigations

Primary School (K–2): Planning and carrying out investigations to answer questions or test solutions in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

Analyzing and Interpreting Data

Primary School (K–2): Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording and sharing observations.

Using Mathematics and Computational Thinking

Primary School (K–2): Mathematical and computational thinking at the K–2 level builds on prior experience and progresses to recognizing that mathematics can be used to describe the natural and designed world.

Constructing Explanations and Designing Solutions

Primary School (K–2): Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomenon and designing solutions.

Engaging in Argument from Evidence

Primary School (K–2): Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

Obtaining, Evaluating, and Communicating Information

Primary School (K–2): Obtaining, evaluation, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Disciplinary Core Ideas (DCI)

LS: Life Science

LS1: From Molecules to Organisms: Structures and Processes

LS 1.A: Structure and Function: Primary Schools (K–2): All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

LS 1.B: Growth and Development of Organisms: Primary School (K–2): Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.

LS 1.C: Organization of Matter and Energy Flow in Organisms: Primary School (K–2): All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

LS 1.D: Information Processing: Primary School (K–2): Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

LS2: Ecosystems: Interactions, Energy and Dynamics

LS2.A: Interdependent Relationships in Ecosystems: Primary School (K–2): Plants depend on water and light to grow. Plants depend on animals for pollination to move their seeds around.

LS3: Hereditary: Inheritance and Variation of Traits

LS3.A: Inheritance of Traits: Primary School (K–2): Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly like their parents.

LS3.B: Variation of Traits: Primary School (K–2): Individuals of the same kind of plant or animals are recognizable as similar but can also vary in many ways.

LS4: Biological Evolution: Unity and Diversity

LS4.D: Biodiversity and Humans: Primary School (K–2): There are many different kinds of living things in any area, and they exist in different places on land and in water.

ESS: Earth and Space Science

ESS1: Earth's Place in the Universe

ESS1.A: The Universe and Its Stars: Primary School (K–2): Patterns of the motion of the sun, moon and stars in the sky can be observed, described and predicted.

ESS1.B: Earth and the Solar System: Primary School (K–2): Seasonal patterns of sunrise and sunset can be observed, described and predicted.

ESS1.C: The History of Planet Earth: Primary School (K–2): Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

ESS2: Earth's Systems

ESS2.A: Earth Materials and Systems: Primary School (K–2): Wind and water can change the shape of the land.

ESS2.B: Plate Tectonics and Large-Scale System Interactions: Primary School (K–2): Maps show where things are located. One can map the shapes and kinds of land and water in any area.

ESS2.C: The Roles of Water in Earth's Surface Processes: Primary School (K–2): Water is found in the ocean, rivers, lakes and ponds. Water exists as solid ice and in liquid form.

ESS2.D: Weather and Climate: Primary School (K–2): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

ESS2.E: Biogeology: Primary School (K–2): Plants and animals can change their environment.

ESS3: Earth and Human Activity

ESS3.A: Natural Resources: Primary School (K–2): Living things need water, air and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

ESS3.B: Natural Hazards: Primary School (K–2): Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.

ESS3.C: Human Impacts on Earth Systems: Primary School (K–2): Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

PS: Physical Science

PS1: Matter and Its Interactions

PS1.A: Structure and Properties of Matter: Primary School (K–2): Different properties are suited to different purposes. A great variety of objects can be built up from a small set of pieces. Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable patterns.

PS1. B: Chemical Reactions: Primary School (K–2): Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

PS2: Motion and Stability: Forces and Interactions

PS2.A: Forces and Motion: Primary School (K–2): Pushes and pulls can have different strengths and directions. Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

PS2.B: Types of Interactions: Primary School (K–2): When objects touch or collide, they push on one another and can change motion.

PS3: Energy

PS3.B: Conservation of Energy and Energy Transfer: Primary School (K–2): Sunlight warms Earth's surface.

PS3.C: Relationship Between Energy and Forces: Primary School (K–2): A bigger push or pull makes things speed up or slow down more quickly.

PS4: Waves and Their Applications in Technologies for Information Transfer

PS4.A: Wave Properties: Primary School (K–2): Sound can make matter vibrate, and vibrating matter can make sound.

PS4.B: Electromagnetic Radiation: Primary School (K–2): Objects can be seen if light is available to illuminate them or if they give off their own light. Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)

PS4.C: Information Technologies and Instrumentation: Primary School (K–2): People also use a variety of devices to communicate (Send and receive information) over long distances.

ETS: Engineering, Technology, and the Application of Science

ETS1: Engineering Design

ETS1.A: Defining and Delimiting Engineering Problems: Primary School (K–2): A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. Asking questions, making observations, and gathering information are helpful in thinking about problems. Before beginning to design a solution, it is important to clearly understand the problem.

ETS1.B: Developing Possible Solutions: Primary School (K–2): Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.

ETS1.C: Optimizing the Design Solution: Primary School (K–2): Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Crosscutting Concepts (CCC)

Patterns

Primary School (K–2): Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Cause and Effect

Primary School (K–2): Simple tests can be designed to gather evidence to support or refute student ideas about causes. Events have causes that generate observable patterns.

Scale, Proportion and Quantity

Primary School (K–2): Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower). Standard units are used to measure length.

Systems and System Models

Primary School (K–2): Systems in the natural and designed world have parts that work together. Objects and organisms can be described in terms of their parts.

Energy and Matter

Primary School (K–2): Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

Structure and Function

Primary School (K–2): The shape and stability of structures of natural and designed objects are related to their function(s).

Stability and Change

Primary School (K–2): Things may change slowly or rapidly. Some things stay the same while others change.

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
Unit 1: Summer Lessons					
K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.	K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.)	Planning and Carrying Out Investigations Analyzing and Interpreting Data	Weather and Climate Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	Patterns Structure and Function Stability and Change	1A Signs of Summer 1B What is Weather?
K-PS3.A.1 Make observations to determine the effect of sunlight on Earth's surface. K-PS3.B.1 With prompting and support, use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. K-ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface. K-PS3-2 Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on an area. K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Constructing Explanations and Designing Solutions	Conservation of Energy and Energy Transfer Sunlight warms Earth's surface and more sunlight means more warmth. Defining and Delimiting Engineering Problems Before beginning to design a solution, it is important to clearly understand the problem. Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. Optimizing the Design Solution Because there is always more than one possible solution to a problem, it is useful to	Patterns Cause and Effect: Mechanism and Prediction Scale, Proportion and Quantity Structure and Function	1C Testing our Cool 1D Tracking Temperatures 1E Keep It Cool, Bear!

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
<p>K-LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]</p> <p>K-ESS3.A.1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p>	<p>K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p>	<p>Asking Questions and Defining Problems</p> <p>Developing and Using Models</p> <p>Planning and Carrying Out Investigations</p>	<p>Organization for Matter and Energy Flow in Organisms</p> <p>All animals need food in order to live and grow. They obtain their food from plants or from other animals.</p> <p>Natural Resources</p> <p>Living things need water, air, and resources from the land, and they live in places that have the things they need.</p>	<p>Systems and System Models</p>	<p>1F What Lives in my Schoolyard?</p> <p>1G Bear-y Good Habitat</p>
<p>K-PS1.A.1 Make qualitative observations of the physical properties of objects</p> <p>K-PS2.A.1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.</p> <p>K-PS2.A.2 Describe ways to change the motion of an object (i.e., how to cause an object to go slower, go faster, go farther, change direction, stop)</p>	<p>K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.)</p> <p>K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.</p>	<p>Developing and Using Models</p> <p>Analyzing and Interpreting Data</p> <p>Engaging in Argument from Evidence</p>	<p>Force and Motion</p> <p>Pushes and pulls can have different strengths and directions.</p> <p>Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.</p> <p>Types of Interactions</p> <p>When objects touch or collide, they push on one another and can change motion.</p>	<p>Cause and Effect: Mechanism and Prediction</p>	<p>1H Pushy Bears</p>

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten Lesson
MLS	NGSS	SEP	DCI	CCC	Lesson
Unit 2: Fall Lessons					
K.ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.	K.ESS2-1 Use and share observations of local weather conditions to describe patterns over time.	Planning and Carrying Out Investigations	Weather and Climate Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	Patterns	2A Bear Observations
K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	K.LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Mathematical and Computational Thinking	Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.		
K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	K.LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	Planning and Carrying Out Investigations	Weather and Climate Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	Cause and Effect	2B Losing Daylight
K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.	1-ESS1-2 Make observations at different times of the year to relate the amount of daylight to the time of the year.	Obtaining, Evaluating and Communicating Information Analyzing and Interpreting Data	Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.		
K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	K.LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	Planning and Carrying Out Investigations	Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	Cause and Effect Patterns	2C Wow! Bears Eat A lot!
K.PS3.A.1 Make observations to determine the effect of sunlight on the Earth's surface.	K.PS3-1 Make observations to determine the effect of sunlight on Earth's surface.	Analyzing Data Modeling Mathematical and Computational Thinking Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	Conservation of Energy Sunlight warms Earth's surface.	Scale, Proportion, and Quantity	2D Bear Needs a Nap

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
<p>K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and animals can change the environment to meet their needs.</p> <p>K.ETS.1.A.1 Ask questions, make observations, and gather information about situations people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K.ETS.1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K.ETS.1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>	<p>K.LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K.ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p> <p>K-2-EST1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>	<p>Asking Questions and Defining Problems</p> <p>Modeling</p> <p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Mathematical and Computational Thinking</p> <p>Constructing Explanations and Designing Solutions</p> <p>Engaging in Argument from Evidence</p> <p>Obtaining, Evaluating, and Communicating Information</p>	<p>Types of Interactions When objects touch or collide, they push on one another and can change motion.</p> <p>Relationship Between Energy and Forces A bigger push or pull makes things speed up or slow down more quickly</p> <p>Force and Motion Pushes and pulls can have different strengths and directions.</p> <p>Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.</p> <p>Defining Engineering Problems A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.</p> <p>Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p>	<p>Structure and Function</p>	<p>2E Finding a Den</p>

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten Lesson
MLS	NGSS	SEP	DCI	CCC	Lesson
Unit 3: Winter Lessons					
<p>K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.</p>	<p>K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>1-ESS1-2 Make observations at different times of the year to relate the amount of daylight to the time of the year.</p>	<p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Mathematical and Computational Thinking</p> <p>Constructing Explanations</p>	<p>Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p>	<p>Patterns</p> <p>Cause and Effect</p> <p>Scale, Proportion, and Quantity</p>	3A Surviving the Cold
<p>K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p>	<p>K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p>	<p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Mathematical and Computational Thinking</p> <p>Obtaining, Evaluating, and Communicating Information</p>	<p>Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems (<i>secondary to K-PS2-2</i>)</p>	<p>Patterns</p> <p>Cause and Effect</p>	3B New Cubs!

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
<p>K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and animals can change the environment to meet their needs.</p> <p>K.ETS.1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K.ETS.1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>	<p>K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p> <p>K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs</p>	<p>Asking Questions and Defining Problems</p> <p>Modeling</p> <p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Constructing Explanations and Designing Solutions</p> <p>Engaging in Argument from Evidence</p> <p>Obtaining, Evaluating, and Communicating Information</p>	<p>Natural Hazards Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events</p> <p>Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems (<i>secondary to K-PS2-2</i>)</p> <p>Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people</p> <p>Optimizing the Design Solution Because there is always more than one possible solution to a problem, it is useful to compare and test designs.</p>	<p>Structure and Function</p> <p>Stability and Change</p>	<p>3C Surviving the Storm</p>

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
K-LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	<p>Asking Questions and Defining Problems</p> <p>Modeling</p> <p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Mathematical and Computational Thinking</p> <p>Constructing Explanations and Designing Solutions</p>	<p>Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.</p> <p>Biogeology Plants and animals can change their environment</p> <p>Defining and Delimiting an Engineering Problem Asking questions, making observations, and gathering information are helpful in thinking about problems (<i>secondary to K-PS2-2</i>)</p> <p>Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people</p>	Patterns Cause and Effect	3D Wake Up, Bear!
Unit 4: Summer Lessons					
K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.	K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.	Analyzing and Interpreting Data Obtaining, Evaluating and Communicating Information	Weather and Climate Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	Patterns Cause and Effect	4A Bear Observations

Missouri Learning Standards	Next Generation Science Standards	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Discover Nature Schools Kindergarten
MLS	NGSS	SEP	DCI	CCC	Lesson
<p>K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and animals (including but not limited to humans) can change the environment to meet their needs.</p> <p>K.ESS3.A.1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p>	<p>K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p> <p>K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p>	<p>Planning and carrying Out Investigations</p>	<p>Organization for Matter and Energy Flow in Organisms Plants need water and light to live and grow.</p> <p>Biogeology Plants and animals can change their environment</p> <p>Natural Resources Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.</p>	<p>Cause and Effect</p>	<p>4B Sprouting Seedlings</p> <p>4C Tree Takeover</p>
<p>K.ESS3.C.1 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or living things in the environment.</p>	<p>K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air and/or other living things in the local environment.</p>	<p>Obtaining, Evaluating and Communicating Information</p>	<p>Human Impacts on Earth Systems Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.</p>	<p>Stability and Change</p>	<p>4D Hungry, Again!</p>
<p>K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.</p>	<p>1-ESS1-2 Make observations at different times of the year to relate the amount of daylight to the time of the year.</p>	<p>Planning and carrying Out Investigations Developing and Using Models</p>	<p>Earth and the Solar System Seasonal patterns of sunrise and sunset can be observed, described, and predicted.</p>	<p>Patterns</p>	<p>4E Sunshine Days</p>



Summer

Lessons at a Glance

Suggested Lesson Timeline for Unit 1 Summer

Unit 1 (Summer) is intended to start at the beginning of the school year and end by the end of September.

- Introduction to Anchoring Phenomenon: 45 minutes
- Lesson 1A: 1.5 hours
- Lesson 1B: 1.5 hours + additional daily observation time
- Lesson 1C: 1.5 hours
- Lesson 1D: 1.5 hours + additional daily observation time
- Lesson 1E: 1.5 hours
- Lesson 1F: 1.5 hours
- Lesson 1G: 1.5 hours
- Lesson 1H: 2 hours

Reading Texts to Support Unit 1 Content

Unit 1 — Essential Reading Texts to Support Lessons:

Introduction to Anchoring Phenomena:

Gleisner, Jenna Lee. (2018). *Black Bears (series: My First Animal Library)*. Minneapolis, MN: Jump! Inc. 24 pages. Lexile 370. ISBN-10: 1624967566.

Lesson 1A:

Rotner, Shelley. (2019). *Hello Summer!* New York, NY: Holiday House. 32 pages. ISBN-10: 082349771.

Lesson 1E:

Stewart, Melissa. (2014). *Beneath the Sun*. Atlanta, GA: Peachtree Publishing Company. 32 pages. Lexile 940. ISBN-10: 1561457337.

Lesson 1H:

Florian, Douglas. (2018). *The Curious Cares of Bears*. Brooklyn, NY: Little Bee Books. 26 pages. ISBN-13: 9781499807431.

Unit 1 — Related Reading Texts to Support Content:

Curtis, Jennifer Keats. (2018). *Baby Bear's Adoption*. Mount Pleasant, SC: Arbordale Publishing. 32 pages. Lexile 640. ISBN-10: 160718740x.

de Vries, Maggie. (2010). *Fraser Bear: A Cub's Life*. Vancouver, British Columbia: Greystone Books. 48 pages. ISBN-10: 1553655214.

Holland, Mary. (2017). *The Beavers' Busy Year*. Mount Pleasant, SC: Sylvan Dell Publishing. 32 pages. Lexile AD590. ISBN-10: 1628552131.

Holland, Mary. (2013). *Ferdinand Fox's First Summer*. Mount Pleasant, SC: Arbordale Publishing. 32 pages. Lexile 620. ISBN-10: 1607186268.

Holland, Mary. (2017). *Otis the Owl*. Mount Pleasant, SC: Arbordale Publishing. 32 pages. Lexile 650. ISBN-10: 1628559403.

Holland, Mary. (2018). *Yodel the Yearling*. Mount Pleasant, SC: Arbordale Publishing. 32 pages. Lexile 560. ISBN-10: 1607184591.

Lamba, Marie & Lamba, Baldev. (2017). *Green: A Community Gardening Story*. New York, NY: Farrar, Straus and Giroux Publishing. 32 pages. Lexile 310. ISBN-10: 0374327971.

Messner, Kate. (2017). *Up in the Garden and Down in the Dirt*. San Francisco, CA: Chronicle Books. 56 pages. Lexile AD660. ISBN-10: 1452161264.

Essential Statements for Unit 1

- I can identify how black bears meet their needs throughout the summer.
- I can identify how Missouri plants and animals meet their needs throughout the summer.
- I can observe how weather patterns and seasons affect plants and animals throughout the summer.

Essential Questions for Unit 1

- How do bears meet their needs throughout the summer?
- How do Missouri plants and animals meet their needs throughout the summer?
- How do weather patterns and seasons affect plants and animals throughout the summer?

Unit 1 Vocabulary

Area — a section of space (lesson 1F)

Cloudy — a white or gray area in the sky made up of very small water drops (lesson 1B)

Critter — an animal (lesson 1F)

Degrees — a way of measuring temperature (lesson 1B)

Desert — land that is very dry and usually very hot (unit 1)

Fur — the hair that covers an animal's body (lesson 1E)

Glade — an open space in a forest (lesson 1A)

Habitat — a place where a plant or animal lives (lesson 1G)

Heat — energy that causes things to get warmer (lesson 1C)

Lizard — a reptile with four legs, a long body, and a tail (lesson 1C)

Pull — to bring something closer to you (lesson 1H)

Push — to move something away from you (lesson 1H)

Partly sunny — some clouds in the sky (lesson 1B)

Phenomenon — something that can be seen and studied (every unit)

Record (ing) — to write or talk about something as proof it was seen or happened (lesson 1B)

Shade — an area where sunlight is blocked by something (lesson 1C)

Shelter — something that covers or protects something (lesson 1G)

Sky — the space above us when we are outside (lesson 1B)

Space — the amount of room that is empty and able to be used (lesson 1G)

Summer — the warmest season, between spring and autumn (lesson 1A)

Temperature — how cold or hot something is (lesson 1B — defined in student book in lesson 1D)

Thermometer — a tool to measure the temperature (pictured in lesson 1D)

Weather — outside conditions at a time and place, includes temperature, clouds, and rain (lesson 1B)

Weight — how heavy something is (lesson 1A)

Woods — also called a forest, where many trees grow together (lesson 1A)



Introduction Lesson

Black Bears

in Missouri

Kindergarten Unit Anchoring Phenomenon: Habitat



The southern half of Missouri has millions of acres of bear habitat that meets the needs of bears in order for them to survive and prosper in our state.

Have a class discussion about bears to elicit what background knowledge students have about them. Students that live in parts of Missouri that have bears will have different experiences and background knowledge than students that do not live in bear country.

Tell me what you know about bears. Where do you think bears live?

Log onto the MDC Teacher Portal at education.mdc.mo.gov. Find the *Black Bear Interactive Story Map* link on the Kindergarten Unit page under Discover Nature Schools. Show students the map of Missouri with the locations of black bear habitat. Keep scrolling through the Story Map and show them a variety of images of black bears in Missouri in different seasons. You will need to help them analyze the map — mark the location of the town or area where the school is to show where students live in comparison to where black bears live. Make a **Noticings and Wonderings** T-chart that allows students to share noticings and wonderings on the topic. Ask students what they notice in the images and on the map.

Read the book *Black Bears* by Jenna Lee Gleisner and introduce the **Noticings and Wonderings Chart** to students.

Teacher Note: The **Noticings and Wonderings Chart** was implemented by Discover Nature Schools educational team to be used as an educational pedagogical tool used to track students' knowledge while studying the phenomenon, present learning and wonderings, and address questions students

have regarding lesson content. A Noticings and Wonderings Chart sample is included in this guide and can be photocopied to use per lesson or unit, depending on teachers' mode of use. Suggested use of the Noticings and Wonderings Chart is by recreating the chart on a large piece of chart paper with the two columns written across the top — Noticings and Wonderings. This chart can be completed for each lesson or alternately completed per unit. Noticings and Wonderings Charts will be used in many lessons to allow for learning anticipation and lesson reflection of concepts learned. See the beginning of this teacher guide for further explanation of Noticings and Wonderings Chart purpose and function. Alternate chart uses: Teacher can record their noticings electronically so that they can be added to for summative purposes at the end of each unit and upon curricular completion. It can be referenced throughout the entire year to allow students to visually track their previous knowledge and wonderings and, retrospectively, answer student wonderings questions from earlier in the units.

Discuss with students that they will be helping fill out the Noticings and Wonderings Chart with the appropriate information. After reading the book *Black Bears* begin filling out portions of Noticings and Wonderings Chart by asking students to share facts they know about bears. This may or may not be indicative of actual facts but starts the discussion of prior knowledge and/or misconceptions. Record student responses in Noticings and Wonderings Chart.

At the end of the first lessons, the teacher will continue to add observations to the Noticings and Wonderings Chart to record what has been learned and how it helps understanding of why bears live in Missouri in the places they live. If there are new questions or observations, add them to the Noticings and Wonderings Chart as well. Do this after each lesson or group of lessons as appropriate.

Sun: ©RoggerDesign/Shutterstock.com

Making Bear Headbands



Students are going to experience the world around them throughout the program as Missouri black bear cubs.



List of Materials

- Black paper for headband strips (4" by 20") and ears (3" wide by 4" tall). Find the headband template at education.mdc.mo.gov/Kindergarten.
- Medium black puff balls (1 ½–2") for nose, one per student
- Small stick-on eyes, two per student
- White or metallic colored pencils
- Scissors
- Hot glue gun with hot glue
- Stapler with staples

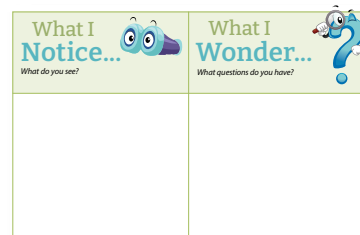
Teacher Preparation: Copy and prepare bear headbands ahead of time.

- Staple or glue precut earpieces to the top of each precut bear headband.

Activity: Each student will receive one prepped bear headband piece.

- Help students hot glue a medium black puff ball to the headband to represent the nose (teacher and parent volunteers should assist with hot glue guns).
 - Instruct students to write their name on the inside of the headband.
 - Instruct students to draw a mouth and teeth on the headband using white or metallic colored pencils.
 - Fit headbands on each student's head and staple to fit (teacher and parent volunteers should assist with stapling).

Teacher Note: In the teacher guide, whenever you see the bear paw print icon, tell your students it's time to get their headbands and become a bear!





Signs of Summer



Investigative Phenomenon

What do I do and see in summer?



Estimated Time

Engage: 15 minutes
Explore: 20 minutes
Explain: 30 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.		Next Generation Science Standard K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.	
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Analyzing and Interpreting Data		Disciplinary Core Ideas (DCI) Weather and Climate	Crosscutting Concepts (CCC) Patterns Structure and Function Stability and Change



List of Materials

- Book: *Hello Summer!* by Shelley Rotner
- Chart paper and markers
- Paper and colored pencils, crayons, or markers for each student (or student notebook)
- Student Guide and pencil



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- Lesson 1A Pictures of different kinds of weather

Engage



- Read the book *Hello Summer!* by Shelley Rotner.

Ask the questions: What are the characteristics of summer? What does summer look like? What does it feel like? What do we do and wear?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Each student will draw a picture of something they do in the summer. They need to include what they wear and their surroundings, including weather if outside. The students will create a collage or mural of their drawings.

Explain



- Use student drawings to create a class collage of summer.

What do we wear in the summer? What are activities that we do in the summer? Why do we do those activities in the summer? When it is summer at our house and school, is it also summer in the woods and wild places of Missouri?

- Students read text from student guide:

What are things that you would do in the summertime?

- Open your student guide, **Unit 1 Exploring the Phenomenon Talk About It** on Page 3.
- Now it's time for us to think about what we may see in the summer. Draw what you may think you see in your student guide, **1A Draw It!** on Page 5.

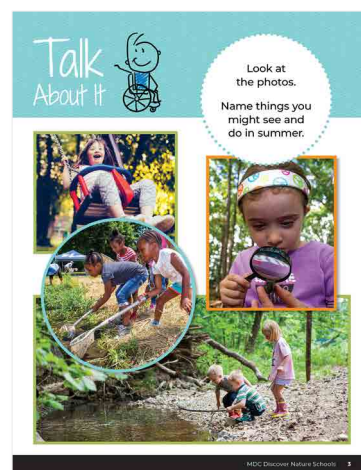
Do you think bears experience summer in the same way you and I do?

- Let's keep going in our student guide and read the **Read Together When it is Summer** on Page 6.

When it is summer,
It is summer for me
It is summer in the house
And it is summer by a tree.

When it is summer
It is summer for a bear
It is summer in the woods
It is summer everywhere.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>



Draw It!

Draw things you might see in summer.



Elaborate



- Find weather images on the *MDC Teacher Portal* at education.mdc.mo.gov under **Discover Nature Schools Kindergarten Lesson 1A**, and look at them as a class.

*Which of these images show the season of summer?
How do you know?*

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Evaluate



Formative Assessment

- Have students complete student guide **Science Notebook** on Page 9, and circle items you would wear in summer.
- As an assessment, students should be able to verbally explain their choices and provide evidence (justification) of what makes the clothing appropriate, using patterns from **Science Notebook** on Page 9.
- All the clothing circled allows our heat to escape so we can stay cool or protects us from the sun.

What material does our rain gear feel like? Think about what an umbrella or rain jacket may be made of and why.

Science Notebook

Summer clothes

Circle items you would wear in summer.

MDC Discover Nature Schools

Cross-Curricular Extensions



Provide students with cardboard to make Season Paper Dolls. Help them to draw and cut out a cardboard model of themselves and create paper clothing for summer gear and rain gear. Items to include: shorts, shirts, rain gear, umbrellas, hats, etc.



Take It Home

Dear Family,

We are starting our Summer Unit and discussing weather and the characteristics of summer. We are asking students to look in their own closet at home and sort their clothes by season.

What clothes would they wear in the summer?

In the fall?

In the winter?

Or in the spring?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

We are starting our Summer Unit and discussing weather and the characteristics of summer. We are asking students to look in their own closet at home and sort their clothes by season.

What clothes would they wear in the summer?

In the fall?

In the winter?

Or in the spring?

Sincerely,

Your Kindergarten Teacher



What is Weather?



Investigative Phenomenon

How do we study weather?



Estimated Time

Engage: 10 minutes

Explore: 10 minutes

Explain: 20 minutes

Elaborate: 30 minutes + 15 minutes x 4 days

Evaluate: 15 minutes



Missouri Learning Science Standard K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.		Next Generation Science Standard K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.	
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Analyzing and Interpreting Data		Disciplinary Core Ideas (DCI) Weather and Climate	Crosscutting Concepts (CCC) Patterns Structure and Function Stability and Change



List of Materials

- Chart paper and markers
- Paper and colored pencils, crayons, or markers for each student (or student notebook)
- Digital thermometer
- Windsock or streamers
- Student Guide and pencil
- 1B Daily Weather Data Chart
- 1B Evaluate Sheet
- 1B Weather Watching Graph



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- Lesson 1B Pictures of different kinds of weather
- 1B Daily Weather Data Chart
- 1B Evaluate sheet
- 1B Weather Watching Graph

Engage



- Open *MDC Teacher Portal* and go to **Discover Nature Schools Kindergarten Unit**. Click on **Lesson 1B**. Show students the pictures of different kinds of weather.

When we look at these pictures, we determined that we would wear different clothing depending on the weather. In what ways is weather different day to day?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Refer to the **Noticings and Wonderings Chart** and fill in the following student answers under the appropriate category:
Look outside today.

How would you describe the weather?

Are you dressed for the weather outside today? Why or why not?

What do you need to know about the weather before getting dressed?

Explain



What can we observe and measure about the weather?

- Chart student ideas. Talk with students about the following ways to measure weather:
 - Sunlight or clouds or mixture.
 - Precipitation (rain, snow)
 - Temperature (warm, cold)
- Have students open student guides to the **Read Together** section on Page 11.

How can we study weather?

What kinds of weather can you name?

- Read with class, having them follow along and/or read depending on ability level. As a class, what kinds of weather can you name? Look at the different kinds of weather in the student guide, **Talk About It** on Page 13.

What kinds of clothing would you wear during the different kinds of weather?

Have students complete student guide **Science Notebook** section and match the correct clothing to the weather on Page 14.



Elaborate



- Introduce the concept of collecting weather data. For this lesson, weather data will be collected as a class.
Note: The first time students collect weather data, show them how to use a digital thermometer, and choose how to record weather for that day on data collection sheets.
- Record findings in the student guide **Science Notebook Recording Weather** on Page 15.
- The student guide **Recording Weather Data Page** will be a repeating page in the student guide under lessons 2A, 3A, and 4A. It is strongly recommended to complete these lessons as this will further address the standard: *K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.*
- For future data collection days, set up protocols for collecting weather data each day or week.
 - What time of day will you collect outside weather data?
 - Will you go as a class or designate alternating students to take a digital thermometer and report findings to the class to record in their books?
- Refer to the **1B Daily Weather Data Chart** on Page 41 of this guide. Each day, week, or designated time data is collected as a class, have students record findings on the **Daily Weather Data Chart**. You may post a larger version of this chart to the front of the class. If additional copies are needed throughout the year, photocopies can be made and distributed to students.
- Collect additional data and determine when it will be filled out each day. How will days that have some rain or some sun be reported?
- **Optional** — Collect data for 4 weeks. If this option is chosen, continue to use the **Daily Weather Data Chart**, a **4-week data collection tool**. Students can draw the weather and record the temperature in the boxes — decide what symbols to use for recording. Ask students why they should all use the same symbols to record. After a week of data collection, discuss how the weather has changed over the course of the week. Has there been a lot of change or a little change? Has it occurred quickly or slowly? There may be rapid change in weather when storm systems come in. Seasonal changes occur more slowly.
- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Recording Weather

Today's temperature is _____ degrees.

Circle one of the following.

Today the sky is ...

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	
	degrees	
	degrees	
	degrees	
	degrees	

1B Daily Weather Data Chart

Daily Weather Data Chart

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	
	degrees	
	degrees	
	degrees	
	degrees	

What I Notice...	What I Wonder...
What do you see?	What questions do you have?



Take It Home

Dear Family,

Your child is learning about weather. Create a home weather log with your family while your child is also making a weather log in class. Don't forget to log the weekends!

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Your child is learning about weather. Create a home weather log with your family while your child is also making a weather log in class. Don't forget to log the weekends!

Sincerely,









Your Kindergarten Teacher

Daily Weather Data Chart

Today the sky is... (circle one)	Today the temperature is...	degrees
   	degrees	
   	degrees	
   	degrees	
   	degrees	
   	degrees	

Today's Weather

Put an X in the boxes that show today's weather.

Sunny		
Partly Cloudy		
Partly Sunny		
Cloudy		
Rainy		
Windy		
Foggy		
Snowy		

Today, it is cool. warm. hot.

1B Weather Watching Graph

Weather Watching Graph										
11										
10										
9										
8										
7										
6										
5										
4										
3										
2										
1										
	Sunny	Partly Sunny	Partly Cloudy	Cloudy	Rainy	Windy	Foggy	Snowy		



Testing Our Cool



Investigative Phenomenon

It is a hot day, and you are outside playing.
How might you cool off?
How do animals cool off?



Estimated Time

Engage: 10 minutes
Explore: 30 minutes
Explain: 15 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K-PS3.A.1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3.B.1 With prompting and support, use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

K-ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Next Generation Science Standard

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on an area.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Science and Engineering Practices (SEP)

Developing and Using Models
Planning and Carrying Out Investigations
Constructing Explanations and Designing Solutions
Obtaining, Evaluating and Communicating Information

Disciplinary Core Ideas (DCI)

Conservation of Energy and Energy Transfer
Defining and Delimiting Engineering Problems
Developing Possible Solutions
Optimizing the Design Solution

Crosscutting Concepts (CCC)

Patterns
Cause and Effect: Mechanism and Prediction
Scale, Proportion and Quantity
Structure and Function



List of Materials

- Digital thermometer — one for each group
- Containers for water, such as a plastic cup (two per partner set of students)
- Water
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- Lesson 1C Pictures of a landscape or park with sun and shade

Engage



- Open the *MDC Teacher Portal* to **Kindergarten Lesson 1C** and share the pictures of the park or landscape with sun and shade. Discuss with students where in the photo they would be warm or hot and where in the picture they would be cooler.
- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- As a class, read the **Read Together** sections from the student guide **Sun and Shade** on Page 17 and **How Animals Keep Cool** on Page 18.

Sun and Shade

The sun gives off heat.
Heat makes us warm.
The shade hides the sun.
Is it cooler or hotter in the shade?

Animals Keep Cool

Animals look for shade when it is hot.
Some animals seek sunny spots.
This helps them warm their bodies.

Go outside to the schoolyard and find both a sunny and shady location. Students should have their student guides open to **Science Notebook Sun — Shade** on Page 19.

- Students find two locations in the schoolyard for sun and shade to collect temperature data for a sunny location and a shady one. With digital thermometer, teacher or student groups can take temperatures with the students recording the data in **Science Notebook Sun — Shade**.

Explain



- Can students make a claim about how it feels in the sun compared to how it feels in the shade? In their student guide on the same **Science Notebook Sun — Shade** page, have students fill in the blanks. "In the shade, it felt ____ " or "In the sun, it felt ____ ." They can choose warm or cool from the word list in their student guides.

*What causes it to be warmer in the sun?
How might a cloudy day change how we feel?*

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Testing Our Cool

What I Notice...
What I Wonder...

It is a hot day and you are outside playing.
How might you cool off?
How do animals cool off?

18 BEARS Through the Seasons | Kindergarten Student Guide

Read Together

Sun and Shade

The sun gives off heat.
Heat makes us warm.
The shade hides the sun.
Is it cooler or hotter in the shade?

MDC Discover Nature Schools 17

Science Notebook

Sun — Shade

Measure and record the temperature in sun and shade. Then fill in the blanks with the word "cool" or "warm."

____ degrees
In the shade, it felt ____.
Cool Warm

____ degrees
In the sun, it felt ____.
Cool Warm

MDC Discover Nature Schools 19

Elaborate



What are other ways of cooling off in the summer?

Do you think water in the sun or water in the shade is cooler?

How can we test our ideas?

- Guide students in planning an investigation where they will collect evidence to answer this question. An idea would be to put a container of water, such as a plastic cup, in the sun and one in the shade. They should determine how long the water will stay there until they measure the temperature of both.

What claim can be made?

What evidence do you have to support the claim?

Are the results the same as when we tested the air in both locations? Is that a pattern?

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate



Formative Assessment

- Once in the classroom, repeat the Engage portion of the lesson and display the pictures of the park or landscape showing sun or shade. Students discuss their understanding of which part of the image is warmer and cooler and why based on what they learned. They can reference the **Noticings and Wonderings Chart** as a reminder of the concepts learned.

Cross-Curricular Extensions

Discuss warm and cool colors with students. Have them create two separate paintings: one of a tree in sun and one of a tree in shade.

Ask students to only use warm colors on the tree in the sun painting and cool colors on the tree in the shade painting.





Take It Home

Dear Family,

Your child is learning about temperature. Explore your neighborhood with your child and consider the following questions.

Which area feels the coolest?

Which area feels the warmest?

Which areas are the sunniest?

Which areas have the most shade?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Your child is learning about temperature. Explore your neighborhood with your child and consider the following questions.

Which area feels the coolest?

Which area feels the warmest?

Which areas are the sunniest?

Which areas have the most shade?

Sincerely,

Your Kindergarten Teacher



Tracking Temperature



Investigative Phenomenon

It is a hot day, and you are outside playing. How might you cool off? How do animals cool off?



Estimated Time

Engage: 15 minutes
Explore: 15 minutes x 5 days
Explain: 10 minutes
Elaborate: 20 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K-PS3.A.1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3.B.1 With prompting and support, use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

K-ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Next Generation Science Standard

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on an area.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Science and Engineering Practices (SEP)

Developing and Using Models
Planning and Carrying Out Investigations
Constructing Explanations and Designing Solutions
Obtaining, Evaluating and Communicating Information

Disciplinary Core Ideas (DCI)

Conservation of Energy and Energy Transfer
Defining and Delimiting Engineering Problems
Developing Possible Solutions
Optimizing the Design Solution

Crosscutting Concepts (CCC)

Patterns
Cause and Effect: Mechanism and Prediction
Scale, Proportion and Quantity
Structure and Function



List of Materials

- Sticky notes or colored paper squares and chart paper to make graphs
- Student Guide and pencil
- 1D Taking Temperature Data Sheet
- 1D Daily Temperature Graph



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- 1D Taking Temperature Data Sheet
 - 1D Daily Temperature Graph

Engage



- Open your student guide to **Lesson 1D Tracking Temperature** on Page 20 to the picture of the Missouri animal sunning itself on the rock.

*It is a hot day, and you are outside playing. How might you cool off?
How do animals cool off?*

- Read together from student guide, **Read Together What is Temperature?** on Page 21.

Temperature is how cold or hot something is.

The air also has a temperature.

What else has a temperature?

Temperature goes up as things get warmer. Animals have a temperature and so do you.

- In the student guide, complete **Science Notebook Sun — Shade Review** on Page 22. Discuss why animals such as turtles and lizards may sit in sunny areas. Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



Why do outdoor pools open later in the morning or in the afternoon?

How can we test our ideas?

- Help students set up an investigation in which they will take air temperature outside three times a day for four to five days. Use the **Science Notebook Taking Temperatures Data Sheet** in the student guide or on chart paper inside the classroom. You can also make copies of **1D Taking Temperature Data Sheet** following this lesson.

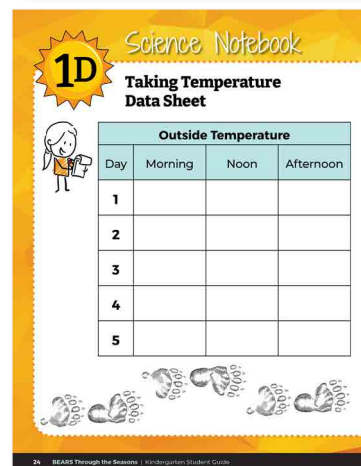
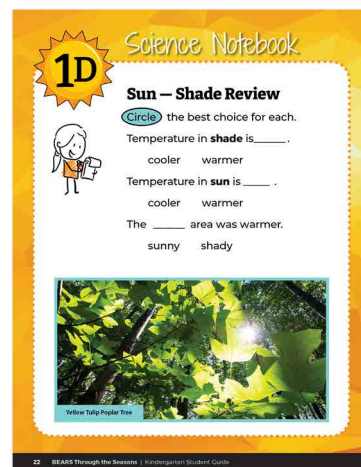
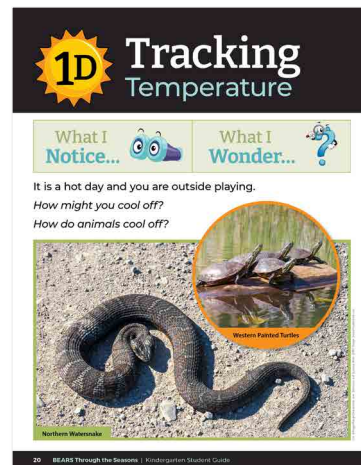
Explain



- At the end of the data collection period of five days, discuss what students notice about the data in their chart.

How do we know if a temperature reading is higher than another?

- Look at numbers for each day and discuss which numbers are highest and which are lowest. Have students put an **H** on the high data and an **L** on the low data entries for each day.



Elaborate



How else can we write the data?

- Assist students in creating bar graphs for each day using sticky notes and partial sticky notes or some other similar method as shown on **1D Daily Temperature Graph Example**.
- Students can then discuss the patterns on the blank **1D Daily Temperature Graph** for each day.

Are the patterns the same each day?

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

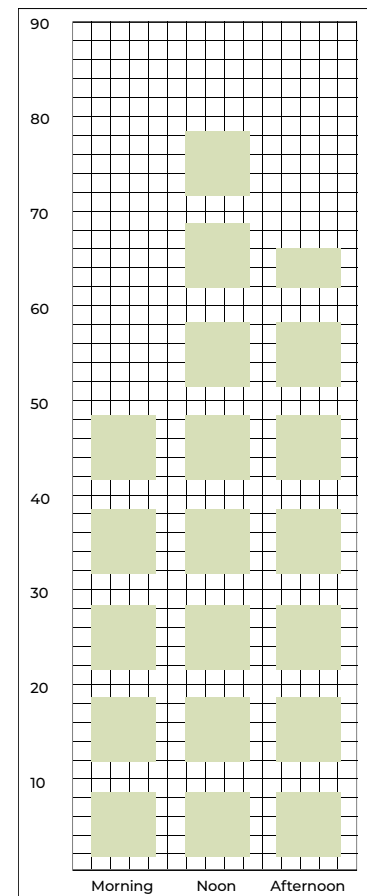
Evaluate



Formative Assessment

- Based upon what we have learned about sun and shade, where might a bear rest to get cool? Why? Have students complete the student guide, **Draw It!** activity on Page 25. Check for comprehension and ask students to justify their drawing location.

1D Daily Temperature Graph Example



Cross-Curricular Extensions

Have students create a line down the center of a plain piece of paper. Have them create a drawing for each of the following two prompts, placing one drawing on each side to compare and contrast.



1. **Draw the area that a black bear might be found on a hot day.** (Pictures should reflect understanding of a bear seeking shady areas, away from sun or perhaps under trees.)
2. **Draw the area a bear might be found during a cloudy, cool day.** *Why is a bear more likely to be found here?* (Answers should reflect that a bear is more likely to be seen roaming out in the open when heat and direct sunlight are less intense than on full-sun days when they would typically seek shade.)

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Draw It!

Imagine it is a sunny summer day in the woods. Draw the best spot for you or a bear to get cool.

American Black Bear



Take It Home

Dear Family,

Your child is learning how animals experience different kinds of weather.
Have your child imagine they are a turtle.

Where around your home would you go to warm up?

Have you seen any turtles in that area?

Where have you seen turtles in your neighborhood?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Your child is learning how animals experience different kinds of weather.
Have your child imagine they are a turtle.

Where around your home would you go to warm up?

Have you seen any turtles in that area?

Where have you seen turtles in your neighborhood?

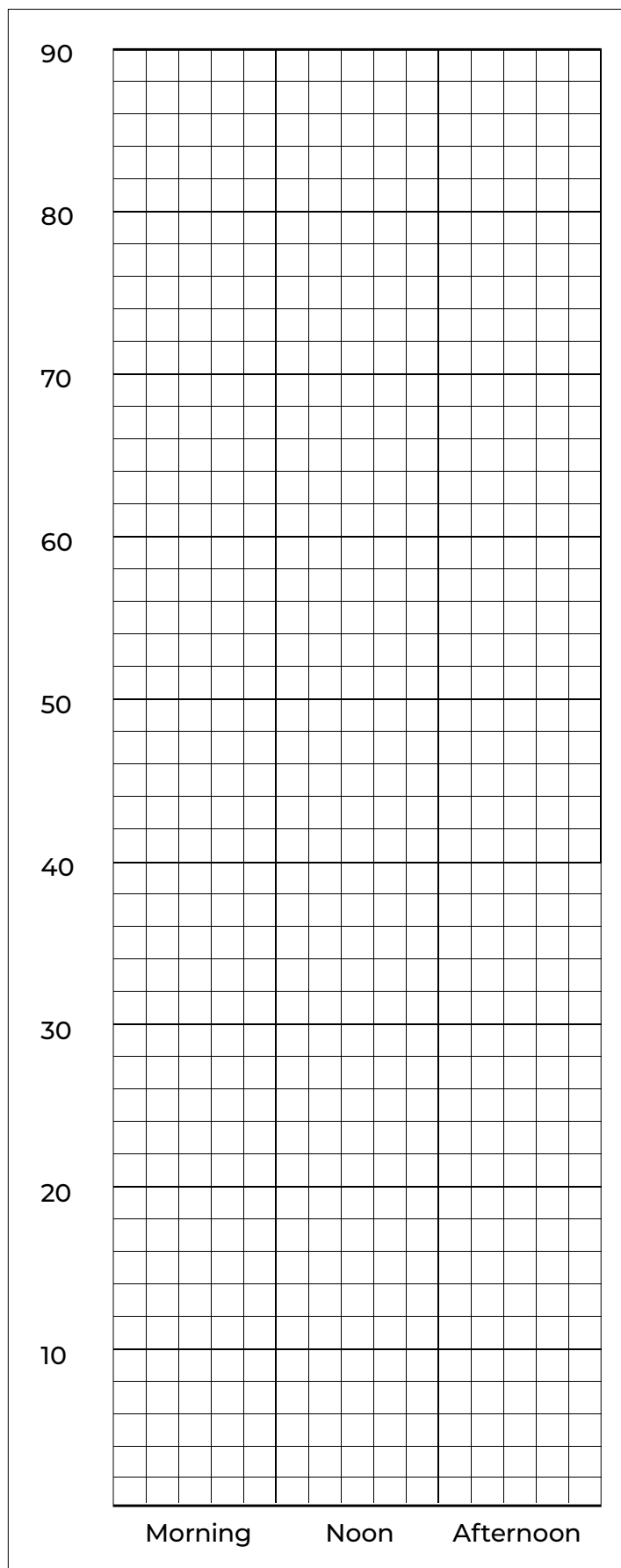
Sincerely,

Your Kindergarten Teacher

Taking Temperature Data Sheet

Outside Temperature			
Day	Morning	Noon	Afternoon
1			
2			
3			
4			
5			

1D Daily Temperature Graph





Keep It Cool, Bear!



Investigative Phenomenon

It is a hot day, and you are outside playing. How might you cool off? How do animals cool off?



Estimated Time

Engage: 15 minutes
Explore: 30 minutes
Explain: 20 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K-PS3.A.1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3.B.1 With prompting and support, use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

K-ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Next Generation Science Standard

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on an area.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Science and Engineering Practices (SEP)

Developing and Using Models
Planning and Carrying Out Investigations
Constructing Explanations and Designing Solutions
Obtaining, Evaluating and Communicating Information

Disciplinary Core Ideas (DCI)

Conservation of Energy and Energy Transfer
Defining and Delimiting Engineering Problems
Developing Possible Solutions
Optimizing the Design Solution

Crosscutting Concepts (CCC)

Patterns
Cause and Effect: Mechanism and Prediction
Scale, Proportion and Quantity
Structure and Function



List of Materials

- Book: *Beneath the Sun* by Melissa Stewart
- Natural or artificial building materials such as: twigs, branches, grass, leaves, Popsicle sticks, toothpicks, paper, glue
- Student Guide and pencil



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- 1E Keep It Cool, Bear! Presentation

Engage



- Read the book *Beneath the Sun* by Melissa Stewart.

How do animals survive and get cool on very hot days?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



How do animals that live in our area stay cool on hot summer days?

- Animals in the book: turkey vulture, woodchuck, earthworm, spittlebug, black swallowtail, caterpillar, osprey, frogs, crayfish.
- Let's go outside for a hike in our schoolyard. As we are hiking, *where do you think these critters would go to stay cool?*

Explain



How are the ways animals cool off the same?

How are they different?

What ways do we, as humans, cool off?

How are our ways the same and different than wild animals?

How do bears cool off? What do they do to warm up?

- Read together from student guide, **Read Together** on Page 27.
Many animals like bears have thick hide or fur. If the temperature gets warm, animals must find ways to cool down.
- Read the **Talk About It** and **Fun Fact** on Page 28.
Think of ways you cool down.

How might an animal cool down?

Are the ways similar?

Some animals have warm blood, and some have cold.

You have warm blood.

Why would animals with cold blood need the sun?

- Read the **Read Together How Do I Compare to a Bear?** on Page 29 and the **Grin and Bear It** on Page 30. Sing to the tune of *Three Blind Mice* for each poem. Then have students complete the following student guide, **1E Draw It!**



How Do I Compare to a Bear?

It is hot. It is hot.

Where can I go? Where can I go?

I can jump into a swimming pool

When it's hot to make me cool.

It is hot. It is hot.

Grin and "Bear" It!

Bears get hot, just like me.

Where can they go?

Where can they go?

They can hide to get cooled down,
under shade trees and
on the ground.

Bears get hot, just like me.

Teacher Note: Open the *MDC Teacher Portal* and go to **Kindergarten Lesson 1E**. Refer to the **Keep It Cool, Bear! Presentation**. Explore the different ways that bears and other animals may cool down. After viewing the different photos, ask the question:

How do bears and other animals cool down?

Elaborate



- Instruct students they are to make a model of something bears or another Missouri animal may find in nature to cool down, using natural or craft materials. They should use what was learned about animal behavior and temperature. Teacher discretion can be used as to the type of model students will make. It can be a diagram or a physical model. The materials for a physical model can vary — craft materials and/or natural materials (craft sticks, twigs, rocks, etc.).

Note: The decision to do a paper diagram model or a physical model may be made based on the amount of time available.

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate



Formative Assessment

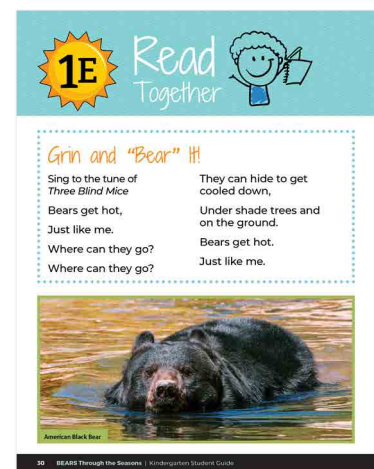
- Share designs with the class. Instruct students to tell how and why their design will be effective and how the design mimics what was seen earlier in the **Keep It Cool, Bear! Presentation**.

How does the shape of the model help to cool off the bears?

- Reference the **Noticings and Wonderings Chart**: Ask students:

What else needs to be added to the chart?

- Ask students what should be added to represent what was learned about bear behavior and bear dens.





Take It Home

Dear Family,

Talk with your child about the weather. Walk around your neighborhood.

Is the weather hot or cold today?

Where are the animals you see?

Do you think they are trying to stay warm or cool off?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Talk with your child about the weather. Walk around your neighborhood.

Is the weather hot or cold today?

Where are the animals you see?

Do you think they are trying to stay warm or cool off?

Sincerely,

Your Kindergarten Teacher



What Lives in My Schoolyard?



Investigative Phenomenon

What lives in my schoolyard?



Estimated Time

Engage: 15 minutes
Explore: 30 minutes
Explain: 15 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K.LS1.C.1 Use observations to describe patterns of what animals (including humans) need to survive. Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.

ESS3.A.1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Next Generation Science Standard

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Science and Engineering Practices (SEP)

Asking Questions and Defining Problems
Developing and Using Models
Planning and Carrying Out Investigations

Disciplinary Core Ideas (DCI)

Organization for Matter and Energy
Flow in Organisms
Natural Resources

Crosscutting Concepts (CCC)

Systems and System Models



List of Materials

- Small plot boundary tool such as: hula hoop, meter stick and mark off square meter, PVC quadrat, yarn and golf tees for each group of students to secure each corner
- Hand lenses
- Collection jars
- Device to take pictures (optional)
- Chart paper or Smartboard for teacher charting
- Student Guide and pencil

Engage



- Ask students the following:

What things live our schoolyard?

What do you expect to find in the schoolyard when you go outside?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.
- Read aloud from the student guide **Read Together Who Lives Here?** on Page 33.

Who Lives Here?

Who lives here?

We might find bugs.

Many critters do.

We might find snails.

We might find many,

We might find animals

We might find few.

With long furry tails.

- Next have students prepare for going into the schoolyard with a warmup activity from the student guide, **Draw It!** on Page 34.

What kinds of things do you think you will find in your schoolyard?

- Draw your guesses in the box below.

Explore



- For this activity students will be going into the schoolyard. Prior to going out, make a small plot boundary device by laying a hula hoop, square meter, square foot or other size PVC quadrat, yarn (with or without golf tees to secure). Anything that will measure out small student areas will work.
- Decide if students will partner or be in larger groups based on the size of the boundary made for observation. Students will find a location in the schoolyard for their observation and place their boundary. Try to find places that have been as undisturbed as possible. After students place their boundary, have them record what they observe within the boundary on student guide, **Draw It!** **My Area** on Page 35.
- Students may draw a diagram or map of their plot and draw as many things as they observe. Have them include as many things as they can. Ask students:

What covers the ground in your area?

Do you see a lot of grass?

Flowers? Soil? Roots?

Are there any animals in your small area?

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Read Together

Who Lives Here?

Who lives here?

Many critters do.

We might find many.

We might find few.

We might find bugs.

We might find snails.

We might find animals

With long furry tails.

Carpenter Bee

Northern Cardinal

Snail

MDC Discover Nature Schools 33

1F

Draw It!

What kinds of animals do you think you will find outside? Draw your guesses below.

BEARS Through the Seasons | Kindergarten Student Guide

MDC Discover Nature Schools 34

My Area

Draw what you found in your area. Remember to draw your shape first and then draw what you see inside your shape.

What questions are you asking yourself as you explore your area?

MDC Discover Nature Schools 35

- Have them draw or write the number of animals or insects that they find (for example, ladybugs: 4; grasshoppers: 2; ants: 20, etc.) in the student guide, **Science Notebook** on Page 36.

Is there evidence that an animal has been there (but may not be there right now)?

Note: Teacher may provide students with hand lenses or devices to take pictures.

- Ask students to think about what questions they may have while they are making observations.
- When back in class, discuss the findings and place them in the **Noticings and Wonderings Chart**.

Explain



- Students will share what they found. Chart the similarities on large paper or white board for class totals and differences in the class data.
- Refer back to their first guess of what they think they would find.

How does it compare to what they actually found?

What questions do they have?

Chart the questions. Ask students the following:

Do these animals have what they need to survive in the little areas we had outside? Why or why not?

Elaborate



- Use this portion of the lesson to make more observations or plan an investigation to answer a question generated in the Explain section. An option would be to see if there is more or less animal activity at different times of day. The animals would likely be insects or other invertebrates unless you have a diverse schoolyard that might include frogs, birds, squirrels, etc.

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate



Formative Assessment

- For assessment, have students complete the student guide, **Science Notebook Who Belongs?** Page 37 and circle the animals that may be found in their schoolyard.

Science Notebook

1F

My Area

How many plants did you see?
How many animals? Make a tally mark (I) for each plant or animal you saw.

Example: Plants	
Plants	
Animals	

Did you see more plants or animals?

What I Notice...

What do you see?

What I Wonder...

What questions do you have?

Who Belongs?

Circle the animals that might be found in your schoolyard.

Illustrations of animals: ladybug, turtle, squirrel, lizard, bird, butterfly, snail, fish, rabbit.



Take It Home

Dear Family,

What lives in your neighborhood? Make a list of wildlife you have seen in your neighborhood. Ask your parents and a neighbor what wildlife they have seen in your neighborhood. Add their list to yours and watch for these animals in your neighborhood.

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

What lives in your neighborhood? Make a list of wildlife you have seen in your neighborhood. Ask your parents and a neighbor what wildlife they have seen in your neighborhood. Add their list to yours and watch for these animals in your neighborhood.

Sincerely,

Your Kindergarten Teacher



Bear-y Good Habitat



Investigative Phenomenon

What do animals need to live?



Estimated Time

Engage: 15 minutes
Explore: 20 minutes
Explain: 15 minutes
Elaborate: 20 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K-LS1.C.1 Use observations to describe patterns of what animals (including humans) need to survive. Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.

ESS3.A.1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Next Generation Science Standard

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Science and Engineering Practices (SEP)

Asking Questions and Defining Problems

Developing and Using Models

Planning and Carrying Out Investigations

Disciplinary Core Ideas (DCI)

Organization for Matter and Energy

Flow in Organisms

Natural Resources

Crosscutting Concepts (CCC)

Systems and System Models



List of Materials

- Chart paper
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- Lesson 1G Video: *Missouri Animals Eating*
- Lesson 1G Link: Missouri Black Bear Story Map

Engage



- Open the *MDC Teacher Portal* and go to **Kindergarten Lesson 1G**. Watch the *Missouri Animals Eating* video.

What do you notice about the animals in the video?
What do animals need to survive?

- Read aloud from student guide **Read Together Habitats** on Page 39.
- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



What do animals need to stay alive?

- Make groups of two to three students. Assign each group a Missouri animal such as a bird, squirrel, deer, mouse, fish, butterfly, honeybee, crayfish, etc. Make sure to assign invertebrates as well as vertebrates. Place an image of the animal assigned in the center of chart paper for each group. Each group will create a poster drawing of what each animal needs to survive. Have each student complete student guide, **Draw It!** activity on Page 41.
- Think about what your animal needs to survive. Draw the needs of your team's animal and what their habitat would look like.

Explain



- Have students do a gallery walk of all the posters. Hang them or put them on tables in an area where all groups can see them. Ask students:

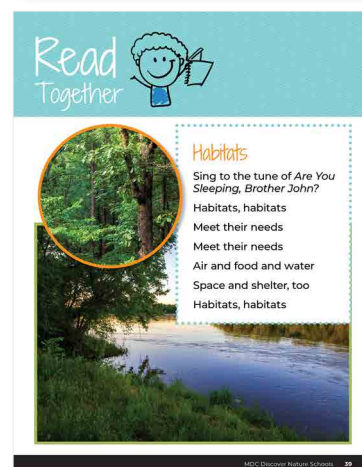
What do you notice about all the drawn items on the poster?
Are there similarities?

- The discussion should bring them to an agreement on what animals need to survive — air, food, water, space/shelter. The place where animals live and have their needs met is called a **habitat**.

What is a habitat?

A habitat is a system that has many parts an animal needs to survive.

- Read aloud again from student guide **Read Together Habitats** on Page 39 sung to the tune of, *Are You Sleeping, Brother John?*
- Choose one student poster and review the animal's habitat as determined by the students. Discuss the parts of the specific habitat, like space, food, and water.

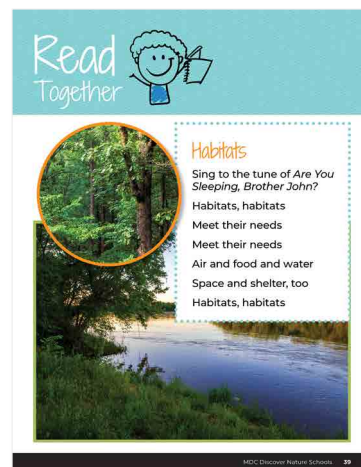


Elaborate



- Distribute a piece of plain white paper and crayons.
 - Imagine you are an animal found in your schoolyard. What animal are you?
 - Now, imagine what you might need to survive. As humans, we often create a grocery list of things we need to buy to live comfortably.
 - Create a “grocery list” of things you might need as your chosen animal by drawing your animal’s needs. Include more than just food items (for example, air, water, and shelter).
- Have students tape their drawings to the walls around the classroom. Take a Habitat Walk to identify different habitats on the posters and what each animal needs. Ask students the following question:

Is there available space/shelter, food, water, and air for these animals in the whole schoolyard to survive?
- Have students brainstorm possible habitat areas in their schoolyard based on availability of air, food, water, and space or shelter. Answers will vary depending on what type of animal the habitat may be suitable for.
- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes.



Evaluate



Formative Assessment

- Visit **Lesson 1G** at education.mdc.mo.gov/Kindergarten, and browse to the interactive **Bear Story Map**. Display the den types again. Students should identify the components of the system that the bear needs to survive. Ask students:

What habitat is surrounding the den? (Forest.)

Why is the forest habitat important for bears to survive?

How are these different parts similar or different to the needs of the animals we explored earlier?

Cross-Curricular Extensions

Bring your habitat to life! Create a diorama of your animal’s habitat using a discarded shoebox and items found outside.





Take It Home

Dear Family,

Find an animal in your neighborhood. Common animals include flies, worms, beetles, spiders, and frogs.

What does the animal need?

Where does it live?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Find an animal in your neighborhood. Common animals include flies, worms, beetles, spiders, and frogs.

What does the animal need?

Where does it live?

Sincerely,

Your Kindergarten Teacher



Pushy Bears



Investigative Phenomenon

How do bears get their food?
(**Teacher Note:** You can reread *The Curious Cares of Bears* and focus only on the months in the summer.)



Estimated Time

Engage: 10 minutes
Explore: 10 minutes
Explain: 10 minutes
Explore: 45 minutes
Explain: 15 minutes
Elaborate: 20 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard

K-PS1.A.1 Make qualitative observations of the physical properties of objects
K-PS2.A.1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2.A.2 Describe ways to change the motion of an object (i.e., how to cause an object to go slower, go faster, go farther, change direction, stop).

Next Generation Science Standard

K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Science and Engineering Practices (SEP)

Developing and Using Models
Analyzing and Interpreting Data
Engaging in Argument from Evidence

Disciplinary Core Ideas (DCI)

Force and Motion
Types of Interactions

Crosscutting Concepts (CCC)

Cause and Effect: Mechanism and Prediction



List of Materials

- Balls of various sizes and weights.
 - Examples:
 - Baseball
 - Softball
 - Playground ball
 - Ping pong ball
 - Tennis ball
 - Bowling ball
- Student Guide and pencil
- Bear headbands from Kindergarten Unit Introduction



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- Lesson 1H Video: *Bears Eating*

Engage



- Have two students come to the front of the room and sit facing each other a short distance apart. Give the ball to one student (in a position where he or she can roll it to the other child). Ask students:

What are the ways that the ball can get to the other person?

How do objects move?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Give student groups a variety of different sizes and weights of balls. You can have the balls rotate through the groups so that each group has only one ball at a time. By making groups of three, you can change the direction the ball goes when moving from child to child. Ask them to find ways without tossing (unless you go outside) to move the ball to another person in their group. Ask students:

How do they move the ball?

How do they stop it?

Can they move it quickly or slowly?

Explain



- Have the class discuss the findings of their exploration. Ask students:

What observations did you make about moving the ball?

In what way did you make the ball move? (Discuss the terms push and pull.)

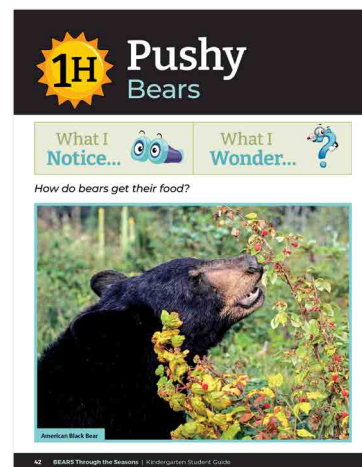
How do pushes and pulls start or stop movement?

What observations were made about bigger or smaller balls, lighter or heavier balls?

What observations did you make about stronger or weaker pushes and pulls?

What happens if a ball hits an object or another ball in motion?

How do you make a ball change direction when it is moving?



Explore



When do bears need to push and pull objects?

- Use the following prompts with students:

Imagine you are a bear. You look for food and shelter, and scratch on trees. How do you think you make your dens? How do you think you get your food?

- Read aloud the student guide, **Read Together Bear-y Hungry** on Page 43.

Bear-y Hungry

How do bears get their food?

Animals do not have grocery stores.

Bears must find their food.

What type of food do you think they might eat?

Use the following prompt with students:

You are going to become a bear! Grab your Black Bear headbands before we head outside so you can “become” a bear.

Note: Reference the **Introduction Lesson: Black Bears in Missouri** for the directions to make black bear headbands. Bear headband template can be found on the *MDC Teacher Portal* under **Discover Nature Schools Kindergarten Introduction Lesson: Black Bears in Missouri**.

- Take students to the schoolyard to investigate the area, while pretending they are a bear. Ask students:

How would you explore this area like a bear?

What would you do to use your push and pulls as a bear?

- Have students shout out what motion they are doing to complete an action as they are doing it.

For example: “I am pushing on this swing, and I am getting my berries from the wild grapevines!”

“I am pushing on this tree to knock it down to make my home!”

- Have them partner to explore the playground for pushes and pulls. Ask students:

How does the strength of the push or pull change the motion?

How can they test their ideas about strength of pushes and pulls or what happens when there are collisions?

Examples to share with the class:

- Bears rolling a log to get to insects underneath. Students could simulate by rolling larger objects and smaller objects.
- Younger bears pushing and pulling when they play.
- Black bears rubbing backs against trees.



Explain



- Upon returning to the classroom, have students explore the cause-and-effect relationship of push and pull strength, direction, and collisions. Students should be able to respond to others' arguments about causes and effects of pushes and pulls and decide as a class if each idea might result in a successful push or pull.

Optional Activity: To actively teach push and pull relationships, see Cross-Curricular Extension at the end of this lesson for the Tug for a Bug activity that is similar to the tug of war game in which groups of bears tug the opposing team to capture imaginary bugs.

Elaborate



- Open the *MDC Teacher Portal* to **Kindergarten Lesson 1H** and play the *Bears Eating* video. *What actions are the bears doing in the video to get their food? How are they using the action of pushing and pulling?*

- Reread *The Curious Cares of Bears* by Douglas Florian.

Ask students:

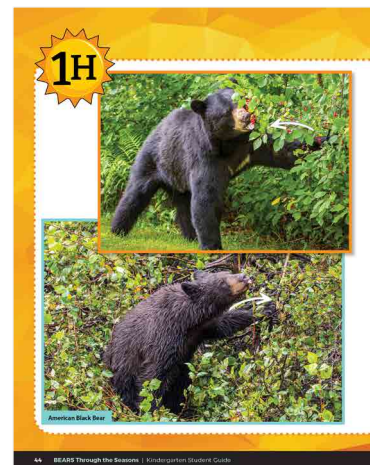
If there is a cause-and-effect relationship between the actions the bear makes in pushes and pulls and how it gets its food?

Think-Pair-Share your observations with the person next to you. Bring your observations to the whole class.

If we were to draw an arrow to show the direction of a push, what direction would the arrow be pointing?

What about for a pull?

- Display the *Bears Eating* video again and pause on a bear pushing and draw or show the direction of the arrow pointing towards the object it is pushing on. Pause on a bear pulling and draw or show the direction of the arrow pointing towards the bear.
- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.



What I Notice... What do you see?	What I Wonder... What questions do you have?

Evaluate



Formative Assessment

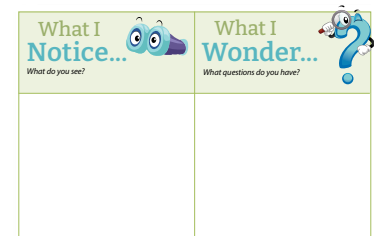
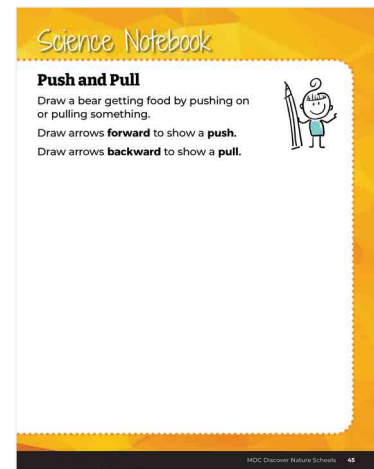
- For assessment in comprehension of pushes and pulls, have students complete student guide, **Science Notebook Push and Pull** on Page 45.
- Draw a bear getting food by pushing or pulling something. Draw arrows forward to show a push. Draw arrows backward to show a pull.

Optional Evaluation: Have students discuss their drawing (model optional) of an animal or human using pushes and pulls to get food. Students should include cause and effect and be able to identify the pushes and/or pulls in the task of acquiring food.

- Refer back to the **Noticings and Wonderings Chart**. Ask students:

What else do we need to add to the chart?

What should we add to what we have learned to help us understand why bears live in parts of Missouri?



Cross-Curricular Extensions

Tug for a Bug Activity



In this game, pairs of students will take turns playing Tug for a Bug (aka tug of war) to depict a bear pulling on a stick to get a bug, but meeting resistance from the tree. A jump rope or along string or yarn can be used. A large, clear space is needed for this game.

Before starting Tug for a Bug, tell students they will be playing a game of strength. One group of students on one end of the rope will imagine they are a bear tugging on a tree limb. The other group of students will be acting as the tree limb and pulling back in resistance.

Practice different numbers of students on each end of the rope, string, jump rope, or yarn.

Students can discuss how the motion of the rope (changes with pull or resistance from the other side) changed the direction of the rope.

Ask students:

What would have happened if the tree limb students would have snapped/let go?

How was it different when fewer students were pulling on one side?



Take It Home

Dear Family,

How do you get food? Do you have to push and pull things to get dinner or a snack? Count how many times you push or pull to get a snack tonight. Go outside and look closely at the ground. Do you see any ants? Are they pushing or pulling on anything to get food?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

How do you get food? Do you have to push and pull things to get dinner or a snack? Count how many times you push or pull to get a snack tonight. Go outside and look closely at the ground. Do you see any ants? Are they pushing or pulling on anything to get food?

Sincerely,

Your Kindergarten Teacher



Fall

Lessons at a Glance

Suggested Lesson Timeline for Unit 2 Fall

The following lessons are intended to start at the conclusion of Unit 1 in September and end by the end of November.

- Lesson 2A: 2 hours + additional daily observation time
- Lesson 2B: 2.5 hours + additional daily observation time
- Lesson 2C: 2 hours
- Lesson 2D: 2.5 hours
- Lesson 2E: 3 hours

Related Reading Texts to Support Unit 2 Content

Lesson 2B:

Branley, Franklyn M. (2016). *Sunshine Makes the Seasons (Let's-Read-And-Find-Out Science 2)*. New York, NY: HarperCollins. 40 pages. Lexile AD510. ISBN-10: 9780062382092.

Gibbons, Gail. (2011). *From Seed to Plant*. New York, NY: Holiday House. 32 pages. Lexile 560. ISBN-10: 0823410250.

Joyce, Melanie. (2019). *Little Acorn*. New York, NY: Scholastic. 24 pages. ISBN-10: 1499882238.

Maestro, Betsy. (2015). *When Do Leaves Change Color?* New York, NY: HarperCollins. 32 pages. Lexile 580. ISBN-13: 9780062382016.

Wildsmith, Brian. (2000). *Animal Seasons*. San Diego, CA: Harcourt School Publishers. 20 pages. ISBN-10: 0153218886.

Lesson 2C:

Florian, Douglas. (2018). *The Curious Cares of Bears*. Brooklyn, NY: Little Bee Books. 26 pages. ISBN-13: 9781499807431.

Unit 2:

Rotner, Shelley. (2019). *Hello Autumn!* New York, NY: Holiday House. 32 pages. Lexile: AD440. ISBN-10: 0823444333.

Unit Phenomenon



Due to the changing seasons, bears have to adjust what they do to survive. The lessening daylight hours and cooler temperatures create an environment that lets bears know that they need to prepare for winter.

Essential Statements for Unit 2

- I can identify several ways that bears know when it is time to prepare for winter.
- I can list what bears and other Missouri animals do in the fall to help them survive the winter.

Essential Questions for Unit 2

- What are several ways that bears know when it is time to prepare for winter?
- What do bears and other Missouri animals do in the fall to help them survive the winter?

Unit 2 Vocabulary

Deciduous — a tree or shrub that drops its leaves each year (lesson 2B)

Den — home of bears and some other kinds of animals (lesson 2E)

Force — power (lesson 2E)

Energy — The ability to do work. Energy comes from the food we eat and the activities we do (lesson 2C)

Hollow — having nothing inside (lesson 2E)

Map — a picture that shows the land (lesson 2D)

Observe — what you see, smell, hear, touch or taste — (lesson 2)

Prepare — get ready (lesson 2A, 3C)

Seedling — a young plant, grown from a seed (lesson 2B)

Survive — to live and stay alive (lesson 2E)

Winter — the coldest season, between autumn and spring (unit 3)



Bear Observations



Investigative Phenomenon

In the fall, plants and animals do different things because of the temperature changes.



Estimated Time

Engage: 15 minutes
Explore: 45 minutes + 10 minutes x 15 days
Explain: 15 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes
Extend: 10 minutes

Missouri Learning Science Standard

K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.

K-ESS2.D.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Next Generation Science Standard

K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science and Engineering Practices (SEP)

Planning and Carrying Out Investigations
Analyzing Data
Constructing Explanations and Designing Solutions
Mathematical and Computational Thinking

Disciplinary Core Ideas (DCI)

Weather and Climate
Organization for Matter and Energy
Flow in Organisms

Crosscutting Concepts (CCC)

Patterns



List of Materials

- Chart paper (2 pieces)
- 2A Bear Cut Outs (30)
- Outside area (school yard)
- Thermometers (digital thermometer optional) (class set, one per student)
- Cups (any size), 2 per pair of students for warm/cold water
- Warm water from the tap
- Ice water
- Clear tape
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 2A Oak Tree Picture
- 2A Reading Thermometers Handout
- 2A Daily Temperature Chart Template
- 2A Daily Weather Chart Template
- 2A Examples of Fall Bear Foods

Engage



- Read aloud from the student guide, **Exploring the Phenomenon Talk About It** on Page 47. Discuss the different photos and how it compares to the pictures from Unit 1.

Look at the photos.

What season is this?

How do you know?

- Read aloud from student guide, **Read Together Winter is Coming** on Page 49.

Winter is Coming

Winter is coming, winter is coming.

It is getting cold, it is getting cold.

Acorns will start falling, bears will eat them up.

It is getting cold, it is getting cold.

- Open the *MDC Teacher Portal* and go to **Kindergarten Lesson 2A**. Show the **Oak Tree Picture** with falling leaves and acorns.

Why do you think we are observing an oak tree?

How do you know winter is coming? (Getting colder, less sun, cloudy, shorter days, rainy, less food available, leaves change colors, wear warmer clothing, etc.)

- Explain that weather includes the daily temperature and how much sun or rain a place may get. *We are going to make observations about our weather like we did in the summer to see if we notice any patterns over a few weeks.* A **pattern** is something that repeats.
- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

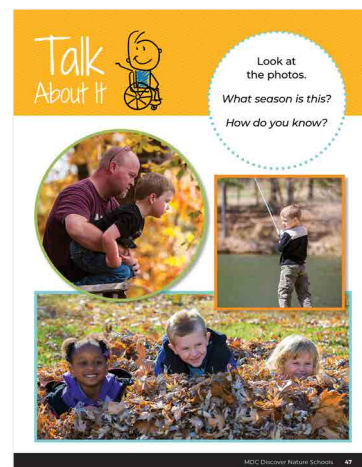


Explore

- We are going to watch for patterns in our weather. Let's look back at our weather observations from **Lesson 1B What is Weather?**

What can be measured to show patterns in our weather? (Student answers: temperature, cloud cover, precipitation, etc.)

We made simple weather observations earlier this year. Today we are going to continue our practice in taking and recording temperature. Over the next few weeks, we are going to measure the temperature each day. We are also going to record how sunny or cloudy it is outside.



Does anyone know what we need to measure the temperature outside? (Thermometer.)

Last time we measured the temperature, we used digital thermometers. Today, we are going to use a different type of thermometer.

- Distribute **2A Reading Thermometers Handout** located at the end of this lesson or display from the *MDC Teacher Portal Kindergarten Unit 2 Lesson 2A* link. Review the thermometers together. *Which thermometer shows the hottest temperature? Which one shows the coldest temperature?*
- Put students into pairs. Give each group a cup of warm water and a cup of ice water. Have the students take turns putting the thermometer in the warm water and then the ice water.

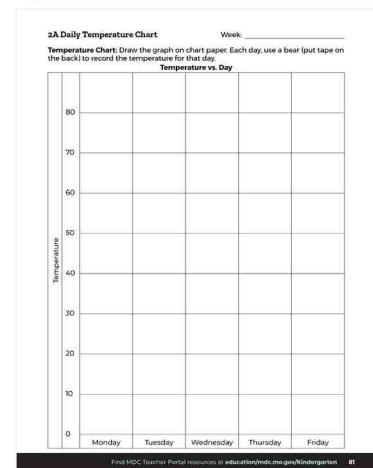
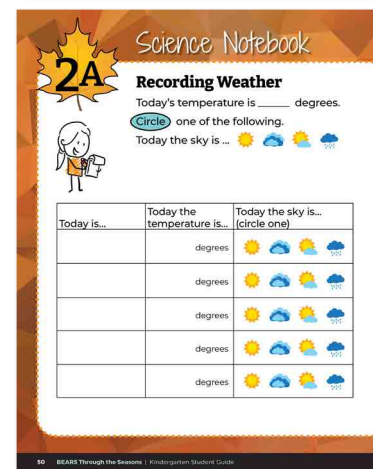
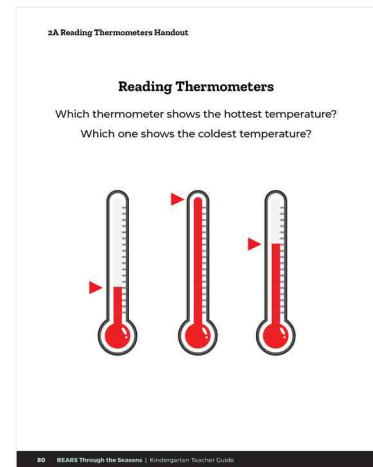
What happens to the red liquid (or the numbers if using a digital) in the thermometer's tube when it is in each temperature of water?

Have them compare answers with one other group and then have a couple of groups share with the whole class. State to the class that the warmer things are, the higher the red liquid travels up the thermometer (or the higher the numbers if using digital).

- *(Daily for three weeks)* Have students collect data each day as they did in summer. Students can make observations by putting a thermometer outside the window and looking at the sky. For the first week, take them outside if possible.
- As a class, go outside with the student guides to record the temperature and collect weather data. Record findings in the student guide **Science Notebook Recording Weather** on Page 50.

Do this Science Notebook activity every day for this week and then continue to record in **2A Daily Temperature Chart**.

1. Record the day's temperature and decide as a class if it is cloudy, partly cloudy, rainy, or sunny.
2. Record observations onto **2A Daily Temperature Chart**. Use the **2A Bear Cut Outs** provided after this lesson. Make 30 cut-outs with a copy machine.
 - a. Use chart paper to make a bar graph of the day's temperature. Each day have a student tape a bear cut-out on the chart to indicate that day's temperature. Tell students that the higher the bear is on the chart, the hotter it is outside.
 - b. Use a different piece of chart paper to make a graph of the cloud cover. Use the example template **2A Daily Weather Chart** to record the type of weather each day. Each day put a bear under the correct column (sunny, partly cloudy, cloudy, rainy/snowy).



Explain



- At the end of the three weeks:

Show students how to read the **2A Daily Temperature Chart** (the higher up the bear, the warmer it is).

What patterns do you notice over the course of the last few weeks? (Getting/staying warmer/cooler).

- Show students **2A Daily Weather Chart** (the more bears under a column, the more times it was sunny/cloudy/rainy/partly cloudy).

What patterns do you notice about the cloud cover over the last few weeks? (Mostly cloudy/sunny/partly sunny/rainy.)

Let's take a look back at our data sheets in the summertime in our student guides under **Lesson 1B** on Page 15.

How do our observations in our student guides compare to summer?

Do we have more sunny days? Cloudier days? Rainier days?

What do you remember about the temperature in the summer?

Using your observations, how do you think the weather will change over the next few weeks? (It will get colder/warmer, stay the same, or get cloudier/sunnier.)

- Show the **Oak Tree Picture** from the *MDC Teacher Portal* again.

What patterns in weather cause the white oak tree to drop its leaves and acorns? (Getting colder, maybe cloudier/rainier, less sunlight.)

What effect would this have on bears who love to eat acorns? (Since the tree is dropping the rest of its acorns and leaves, bears try to eat as much as they can before they are all gone.)

One of a bear's favorite foods is acorns that grow on oak trees. Oak trees respond to patterns in the weather. Explain that bears notice a lack of food and that tells them that it is time to prepare for winter.

Note: This will depend on what season it is for you when you complete the charts.

2A Daily Temperature Chart Week: _____

Temperature Chart: Draw the graph on chart paper. Each day, use a bear (put tape on the back) to record the temperature for that day.

Temperature vs. Day

80					
70					
60					
50					
40					
30					
20					
10					
0					
	Monday	Tuesday	Wednesday	Thursday	Friday

Find MDC Teacher Portal resources at education.mdc.mo.gov/Kindergarten

2A Daily Weather Chart

Daily Weather Chart

Each day, put a bear (put tape on the back) under the appropriate weather.

Daily Weather			

BEARS Through the Seasons | Kindergarten Teacher Guide

Elaborate



- Explain that oak trees start to lose their leaves and their acorns as the weather gets colder and there is less sunlight. Bears respond by searching for all the acorns that they can find. This helps them put on fat to prepare for winter. Acorns provide a lot of fat for bears which is why this is their favorite meal this season.

Reference **Examples of Fall Bear Foods** from *MDC Teacher Portal Kindergarten Lesson 2A*. In addition, hazelnuts, corn, and persimmons are also food sources bears will eat during this time.

There are other animals in Missouri that love acorns as well: squirrels, blue jays, raccoons, and turkeys all eat acorns. Have students complete the student guide **2A Draw It!** on Page 51.

You have learned that bears prepare for winter by eating more. When the temperature starts to drop, what other animals in Missouri also prepare for the winter? In what way does that animal prepare for winter? Draw it!

Compare drawings and discuss what other Missouri animals may do to prepare for winter.

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate

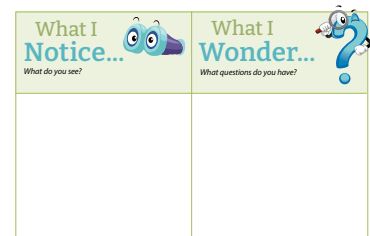
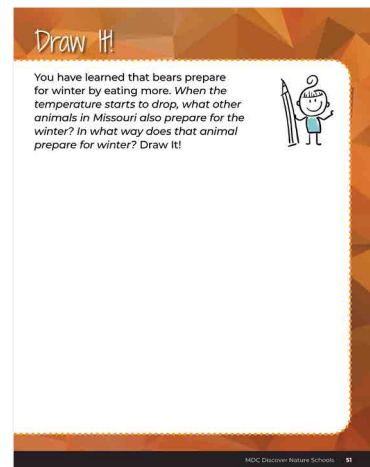


- Have students look for patterns on the **Daily Temperature Chart** and determine which day is showing the warmest and coldest temperatures. Discuss with students how they came up with their answers.

Extend



- Refer back to **Noticings and Wonderings Chart** and record weather observations. Predict how Missouri animals and plants may change their behavior when preparing for winter.



Cross-Curricular Extensions

Movement: Go outside and have students line up shoulder to shoulder. Shout out different actions that depict how animals may prepare for the winter and have the students act out those different actions such as forage, migrate (or fly south), sleep, make a den, collect acorns, etc.





Take It Home

Dear Family,

Look around your neighborhood for signs that show what season it is. How do you know what season it is? Draw a picture of what this season looks like from your window.

Once a month, take three colors you see in the sunset and draw a colorful picture. As a family, mark the time you saw the sunset. How do the colors change or stay the same throughout the year? How are the colors different in the winter compared to the spring? Write down the time of the sunset on your picture and see what you notice over time!

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

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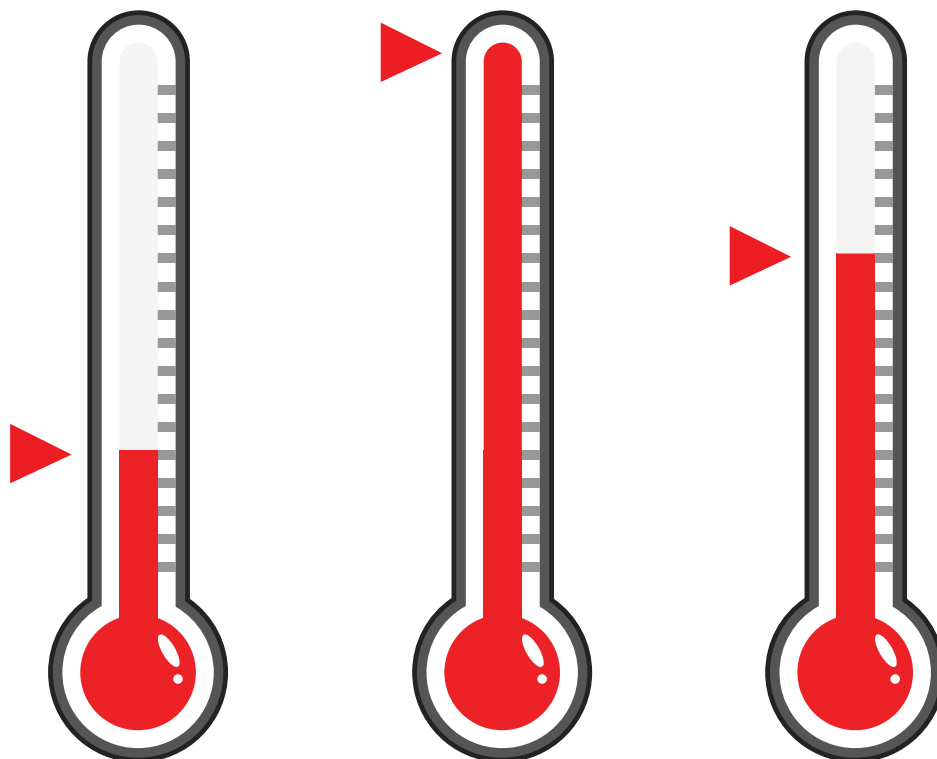
Sincerely,

Your Kindergarten Teacher

Reading Thermometers

Which thermometer shows the hottest temperature?

Which one shows the coldest temperature?

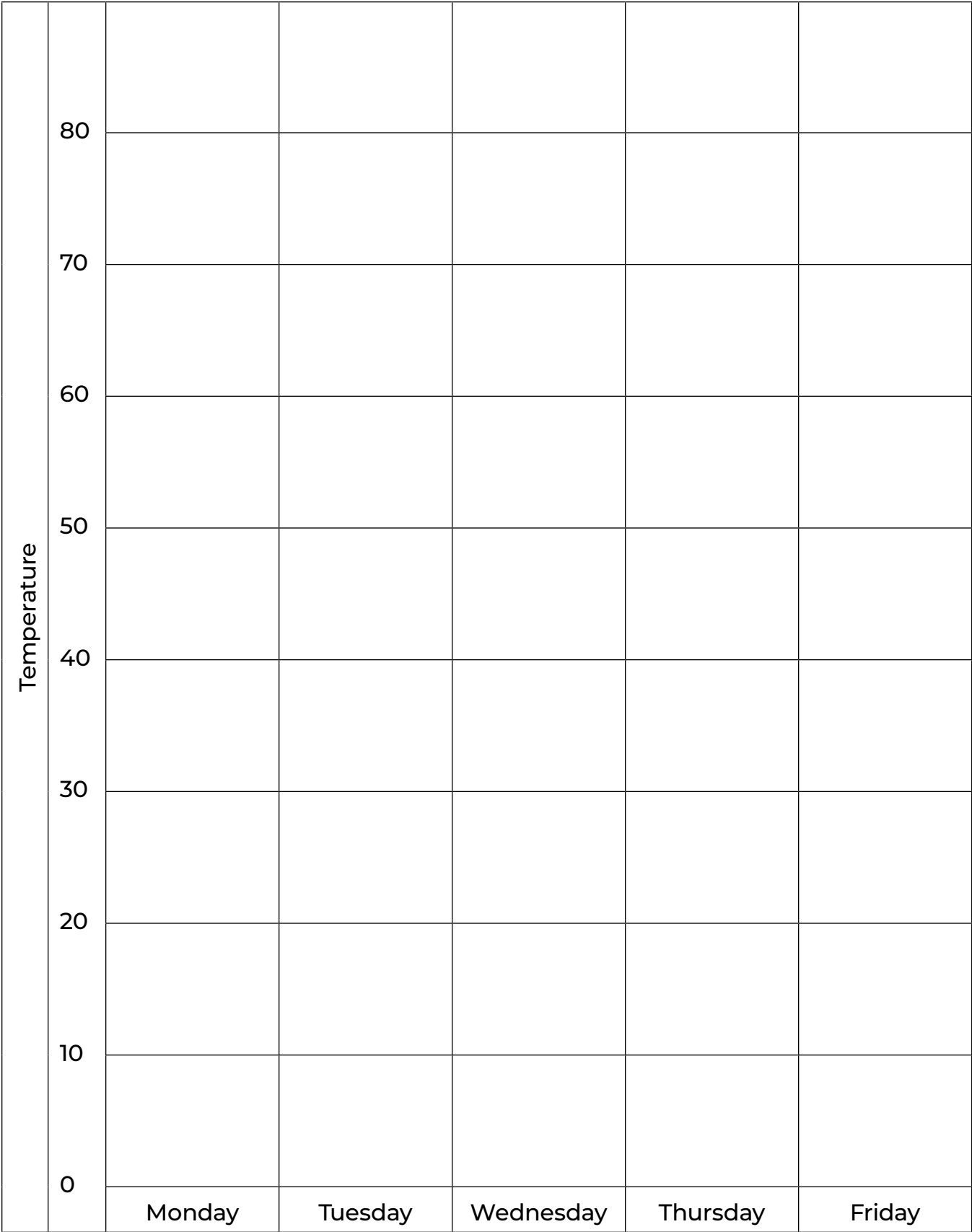


2A Daily Temperature Chart

Week: _____





Temperature Chart: Draw the graph on chart paper. Each day, use a bear (put tape on the back) to record the temperature for that day.

Temperature vs. Day



Daily Weather Chart

Each day, put a bear (put tape on the back) under the appropriate weather.

Daily Weather			
			

Weather Icons: ©nataka/Shutterstock.com

2A Bear Cut Outs





Losing Daylight



Investigative Phenomenon

Trees can look different through the seasons based on what they need to survive.



Estimated Time

Engage: 20 minutes
Explore: 60 minutes + 15 minutes x 5 days
Explain: 20 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes
Extend: 15 minutes

Missouri Learning Science Standard K-ESS2.B.1 Make observations during different seasons to relate the amount of daylight to the time of year. K-LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.		Next Generation Science Standard 1-ESS1-2 Make observations at different times of the year to relate the amount of daylight to the time of the year. K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Obtaining, Evaluating, and Communicating Information Analyzing and Interpreting Data	Disciplinary Core Ideas (DCI) Weather and Climate Organization for Matter and Energy Flow in Organisms	Crosscutting Concepts (CCC) Cause and Effect



List of Materials

- Oak acorns for each pair of students (Optional if lacking time: fast-growing seeds so that each pair of students can have 2–3 seeds. Seed suggestions: marigolds, basil, or a Missouri native seed)
- One cup per group (any size)
- Soil — enough for each cup
- Water for seeds
- Book: *Little Acorn* by Melanie Joyce
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- Cut outs of 2B Seasonal Clothing Cards (1 set per group)
- Cut outs of 2B Seasonal Activities Cards (1 set per group)
- Cut outs of 2B Card Sort Seasonal Table (1 table per group)
- 2B Putting It All Together Chart handout (1 per group)

Engage



- Ask students to look around the room.

*What kinds of clothing are most of their friends wearing?
What kind of clothing were they wearing several months ago?
What kinds of clothing will they be wearing a few months from now?*

- Show different kinds of clothing to spark their background knowledge. *Do they notice that sometimes they go to school in the dark and sometimes they don't? Do they notice that sometimes they have to come in earlier from playing while at other times of the year they can stay out later because the sun is out longer? Does this relate to what they are wearing? Why do we wear different kinds of clothes during different times of the year?*
- Divide students into groups of 2–3. Give each group of students the **2B Card Sort Seasonal Table** located at the back of this lesson and on our *MDC Teacher Portal* under **Kindergarten Lesson 2B**. Review that you will give them different cards to sort under each column. Hand out cards from the **2B Seasonal Clothing Cards** and **2B Seasonal Activities Cards**.

How did you sort your cards? Why did you sort them that way?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Reference from the student guide, **Read Together Pictures of Trees** on Page 53.

Ask if they can identify the time of year by looking at the trees.
Ask students:

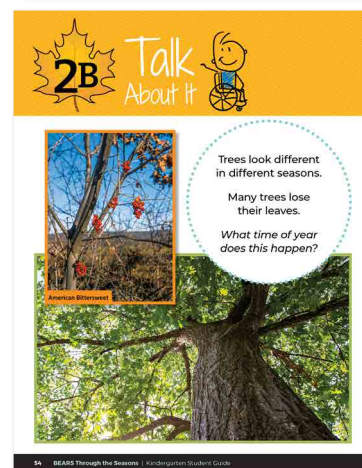
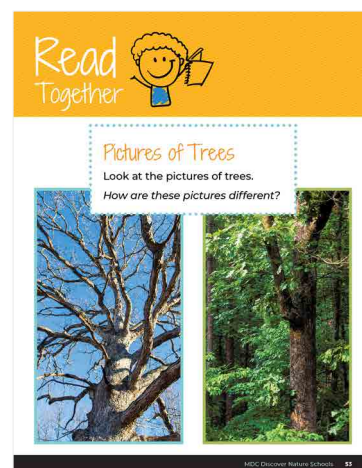
How are the photos different?

Why do you think the trees look different at different times of the year?

- Have students read the **Talk About It** section from their student guide on Page 54.

Talk About It

Trees look different in different seasons.
Many trees lose their leaves.
What time of year does this happen?



Tell students: We are going to explore what plants need to survive and see if we can figure out why trees look different at different times of the year.

- Read aloud from the student guide, **Read Together Losing Leaves** on Page 55.

Losing Leaves

In the fall, trees look different than in summer.

Why do you think this happens?

Do you dress differently in fall than in summer?

- Have students complete the student guide **Science Notebook Match the Season** on Page 56.

Put students into groups of three. Have them plant an oak seed, which is also called an **acorn**.

Give each group three different cups filled with potting soil. Put one cup in the sun and give it water. Put another cup in the sun but do not give it water. Put the third cup somewhere in the classroom that does not get much sunlight and give it just a little water. Put the names of the group on the cups.

What do you observe about the seeds that you planted in each cup?

Have students draw what they see for each cup in student guide **Science Notebook My Growing Seedlings** on Page 57.

Teacher Note: It takes about a week for acorns to germinate and about 6 weeks to fully sprout into a plant, so you may want to start this a few weeks in advance. You can also use faster sprouting seeds like native flowers or milkweed. If you are lacking time, you can use seedling plants. Contact your local MDC conservation educator for help finding locally sourced seeds at mdc.mo.gov/contact-engage. If you use acorns, students will need to conduct a water test to see if the acorn will germinate. Visit the *MDC Teacher Portal Kindergarten Unit 2 Lesson 2B* link to learn more about how to grow oak trees.

Explain

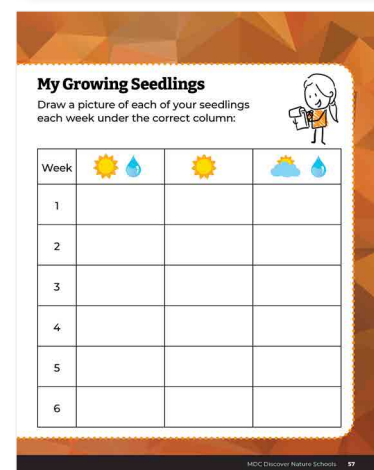


- Review the student guide **Science Notebook My Growing Seedlings** data pages.

What did you notice over the course of our several weeks of growing our oak trees? What do plants need to survive? (Soil, water, sunlight.)

- Read the book *Little Acorn* by Melanie Joyce.

In what ways did the trees grow and change in the story?



Elaborate



- Go back to the **Read Together Pictures of Trees** on Page 53.

Look at the tree in the summer.

What causes the tree to look that way? (Getting plenty of sun and water.)

What about for the fall? What about for the winter?

Do we get more light in the fall and winter or less light? What do you think the effect of having longer or shorter amounts of daylight has on the oak tree?

Do we get more water?

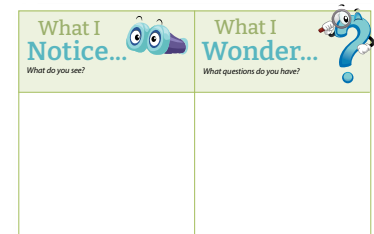
Let's think back to our cards we sorted earlier. Ask students:

What effect do longer or shorter amounts of daylight have on what kinds of clothing we wear throughout the year?

What patterns do you notice about the amount of daylight from year to year? (It repeats as the seasons do.)

What effect does the amount of sunlight during each season have on people? Trees? Bears? Why do bears eat so many acorns and other plants before the winter?

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.



Evaluate



- Distribute **2B Putting It All Together Chart** handout located after this lesson. In the box under each season, have students draw themselves and what the weather will look like in each season by an oak tree.

Extend



- Tell students that other animals in Missouri are affected by the amount of daylight in each season. Have them read *Sunshine Makes the Seasons* by Franklyn Brawley or *Animal Seasons* by Brian Wildsmith about how frogs and insects transition from the fall to winter. Ask students how the time of year and the amount of sunlight affects the animals.

Cross-Curricular Extensions



Group play acting:

Have students imagine that they are a group of bears nearing winter. Arrange several areas to designate trees in the classroom.

This can be done by drawing and taping large paper trees with separate paper leaves attached or taped to a spot on the wall.

Gather several cups full of acorns (or round items to simulate acorns if none are available) and strategically place the cups of acorns near the trees with removeable leaves located all around the room. Some trees may not have a cup full of acorns placed under it, or perhaps have an empty cup with no acorns.

Tell students that when the teacher signals go, they must act as bears nearing winter and seek acorns across the room.

Upon the “bears” collecting all acorns, another round of play can be done, but indicate to students that winter is nearing.

For this round, have students remove the leaves from paper trees to signify winter and explain to children that in this round, there is less sunlight, cooler days, and trees are losing leaves.

This time, place very few “scattered acorns” around the trees, making sure to leave many trees without acorns.

Start another round of play at the teacher’s signal and have the “bears” look for food.

After play, discuss with students which round of play contained more acorns.

Which round of play was food scarce?

What changes in sunlight affected acorn production?

What else made finding acorns difficult?



Take It Home

Dear Family,

Adopt a tree in your yard or neighborhood. Watch and draw how the tree changes every week or month. Make sure to put the sun in your drawings. Discuss how does the tree changes through the year. How does the sun change through the year?

Sincerely,

Your Kindergarten Teacher



Take It Home

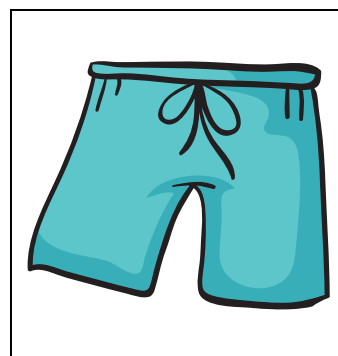
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Sincerely,

Your Kindergarten Teacher

2B Seasonal Clothing Cards



Scarf: ©Karkas/Shutterstock.com; Shorts: ©White Space Illustrations/Shutterstock.com; Coat, Hat, Pants, Umbrella, Swimwear, Raincoat, Shirts: ©nataka/Shutterstock.com

2B Seasonal Activities Cards



Longer days
with lots of
sunshine

Shorter days
with less
sunshine



Season Card Sort

Place the cards under the correct season.

Summer	Fall	Winter	Spring

Putting It All Together

In the box under each season, draw yourself in each season by an oak tree and what the weather will look like.

<div></div> <div>Summer</div>	<div></div> <div>Fall</div>
<div></div> <div>Winter</div>	<div></div> <div>Spring</div>



Wow! Bears Eat a Lot!



Investigative Phenomenon

In order to survive, black bears prepare for winter by changing the amount of food they eat and looking for the right place to sleep.



Estimated Time

Engage: 10 minutes
Explore: 45 minutes
Explain: 20 minutes
Elaborate: 15 minutes
Evaluate: 20 minutes

Missouri Learning Science Standard

K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K.PS3.A.1 Make observations to determine the effect of sunlight on the Earth's surface.

Next Generation Science Standard

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

Science and Engineering Practices (SEP)

Planning and Carrying Out Investigations
Analyzing Data
Modeling
Mathematical and Computational Thinking
Constructing Explanations and Designing Solutions
Engaging in Argument from Evidence

Disciplinary Core Ideas (DCI)

Organization for Matter and Energy
Flow in Organisms
Conservation of Energy and Energy

Crosscutting Concepts (CCC)

Cause and Effect
Patterns
Scale, Proportion, and Quantity



List of Materials

- 2 different sandwich bags with 2 different weights (one set per group) — one that is very light (1–2 beans) or empty and one that is very heavy (full of beans)
- 4 to 6 blankets that are large enough to cover a student
- Swatch of bear fur (or contact your local MDC conservation educator to borrow a bear pelt)
- Chart paper
- Student Guide and pencil
- Balance scale



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 2C Spring, Summer, Fall, and Winter Bear Pictures (one for each corner of your room)
- 2C Guess the Season Board handout
- Video: *Bear Cubs* — Ask MDC

Engage



- Ask students:

What is your favorite kind of food?

Do you like many kinds of food or just a few things?

Are there times when you eat a lot of food? Are there times when you don't eat much at all? Why do you think that is?

Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Explore



- Show the video *Bear Cubs — Ask MDC* located on the *MDC Teacher Portal* under **Kindergarten**. Bears like all kinds of foods from plants to small animals. However, they don't eat the same amount of food all year long. Ask students:

When do you think bears eat the most?

Read aloud from the student guide **Read Together Hungry As Can Be** on Page 59 to the tune of the ABC song.

Hungry as Can Be

In the fall, yes, we can see,
bears are hungry as can be.
They eat and eat all the time,

sleeping through the wintertime.
In the fall, yes, we can see,
bears are hungry as can be.

- Display the **2C Spring, Summer, Fall, and Winter Bear Pictures** following this lesson or print from the *MDC Teacher Portal*. Put the signs in four areas of the room.

When do bears eat the most?

Students should silently ponder this question. After they silently make their choice, tell them to walk to that corner of the room. Have students discuss why they chose their answer in their group.

Tell them that they are going to use different proportions of beans or sand in sandwich bags to learn about a bear's pattern of eating throughout the year. The bags represent how full a bear's stomach is after eating.

We are going to explore why bears eat different amounts of food in different seasons.



Divide students into groups of three or four. Give each group a scale and two different sandwich bags filled with two different amounts of beans, sand, or rice. One bag should be very light (1–2 beans) or empty, and one should be very heavy (full of beans).

Have the students weigh each sandwich bag. Students can also use a balance scale to compare the bags. Help students read the numbers on the scale or determine which has more.

What do the sandwich bags represent? Discuss with students that the sandwich bags act as a model to represent the quantities of foods that bears eat through the seasons.

Make a prediction about which bag represents the amount of food a bear eats in the spring, summer, fall, and winter. **When do you think bears eat the most? The least?** Then place the bags onto **2C Guess the Season Board** to show their predictions of when they think the bear would eat the most and the least.

In what season is the bag the heaviest?

In what season is the bag the lightest?

Bears generally do not eat during the winter, so the bag would be empty. Discuss how the real quantities of food that bears eat are much larger than the sandwich bags. Scientists compare the weight of things to learn more.



Explain



Why do bears eat a lot during a certain time of the year?

- Tell them that bears eat most in the fall and least in the winter because bears are hibernating. Does your board show this? Do you need to revise your bags on your **Guess the Season Board**?

Why would bears eat more food, like acorns, in the fall?

What is the effect from eating so much food?

Discuss cause and effect. Bears eat the most in the fall because of the food that is available. **What food is available in the fall?** Many plants and their parts including: acorns, persimmons, hazelnuts. The food a bear eats is what gives it energy. Bears gain a lot of weight in the fall to prepare for their long winter's sleep, so they eat the most in the fall. Increasing how much food they eat helps bears prepare for winter. Much of the energy from this food is stored as layers of fat. During winter, bears still breathe and their bodies are still working even though they may be sleeping or if they need to move for any reason. These extra fat layers also help the bear to stay warm. It is these extra fat layers of energy that help the bear survive through the winter months.

What happens to bears when they do not eat in the winter, but are surviving on their energy in the form of fat?

Do they get bigger or smaller?

Do you think bears follow that pattern of eating every year or just some years?

Read *The Curious Cares of Bears* by Douglas Florian.

Elaborate

- Reference the activity of winter denning at the end of *The Curious Cares of Bears*. Tell students to pretend that it is winter, and they are very cold. *What could they do to get warmer?*

Show students a stack of blankets. Ask students what would happen if we put one blanket on them, then two, then three, and so on. Ask for some volunteers to try it. Ask students how this is like the fat layers that bears gain in fall during when they are overeating.

Tell students that bears also get a thicker coat of fur in the winter to keep them warm. Pass around a sample of fur.

Teacher Note: If you do not have a swatch of black bear fur to pass around, contact your local MDC conservation educator to reserve an available bear pelt.

Have students compare how the bear's fur keeps it warm to how blankets keep people warm. Turn and talk to your elbow partner.

How does the warmth of bear's fur and its layer of fat keep it warm in the wintertime?

How does this compare to how we as humans use blankets?

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate

Why is fall better than winter to eat large amounts of food?

Why do bears put on those layers of fat before they go to their dens?

- Have students draw the activity of bears eating in the fall in their student guide **Draw It! Storing Up** on Page 60.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Draw It! 2C Storing Up	
Draw what a bear does in the fall. How big is your bear?	Draw what a bear does in the winter. How big is your bear?
Are the bear sizes different? Why?	

- Tell them that there is a cause-and-effect relationship between things in nature. Think back to the last lesson, **Losing Daylight**, and open their student guide to **2B Draw It! My Growing Seedlings** on Page 57.

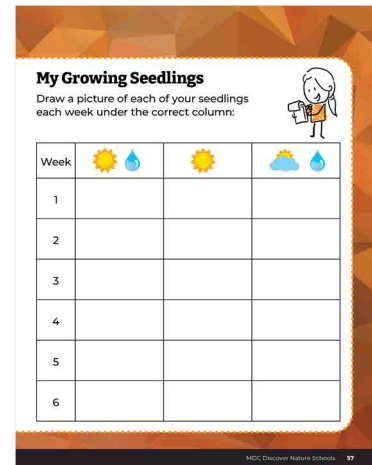
What was needed to help the acorns grow? (Water and sunlight).

- Open your student guide to **Science Notebook What Happens Next?** on Page 61.




What do you think should come first, next and then last?

Draw it in on the chart. Let's discuss your answers. (Order: sunlight and water, oak tree and an acorn, and a bear eating)

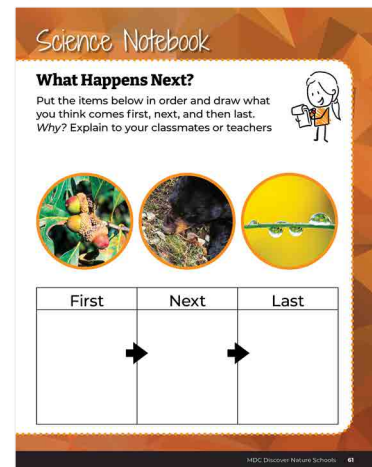
The first box is the cause, which is the amount of sunlight and water available during fall. The next box is the effect, which determines the amount of food available based on the amount of sunlight and water. The last box is the effect that determines how much food the bears will eat, based on the food that is available, which is based on the amount of sunlight and water.






My Growing Seedlings
Draw a picture of each of your seedlings each week under the correct column:

Week			
1			
2			
3			
4			
5			
6			

HDC Discover Nature Schools 57



Science Notebook
What Happens Next?
Put the items below in order and draw what you think comes first, next, and then last. Why? Explain to your classmates or teachers

First	Next	Last

HDC Discover Nature Schools 61



Take It Home

Dear Family,

Find and watch a squirrel. What is the squirrel doing? What is it eating? Do you think the squirrel eats the same food all year? Make a grocery list for your family. What do your groceries look like for the week? If you were a plant, what kinds of new things would be included on the weekly shopping list? If you were an animal, how would the shopping list change?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Find and watch a squirrel. What is the squirrel doing? What is it eating? Do you think the squirrel eats the same food all year? Make a grocery list for your family. What do your groceries look like for the week? If you were a plant, what kinds of new things would be included on the weekly shopping list? If you were an animal, how would the shopping list change?

Sincerely,

Your Kindergarten Teacher

2C Spring, Summer, Fall, and Winter Bear Pictures

Spring



Fall



Summer



Winter



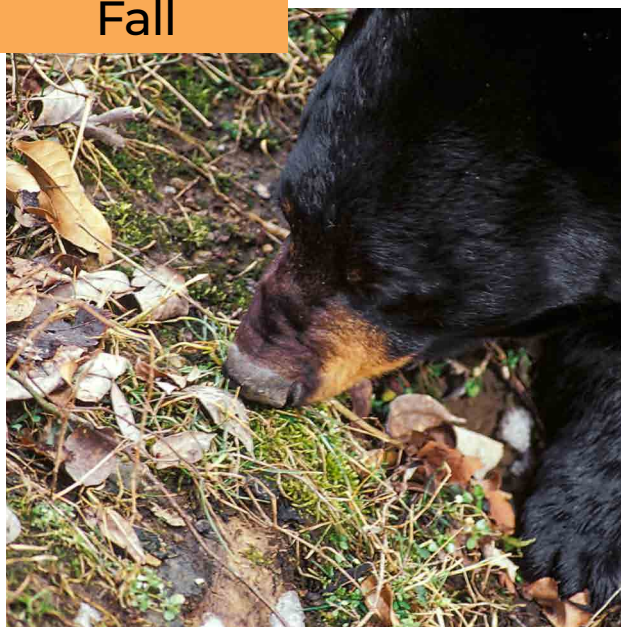
(Pages 100–101) Mother Bear with Cubs. ©Dissimages/Dreamstime.com

2C Guess the Season Board

Spring



Fall



Summer



Winter



Bear Needs a Nap

Investigative Phenomenon

In order to survive, black bears prepare for winter by changing the amount of food they eat and looking for the right place to sleep.

Estimated Time

Engage: 10 minutes
 Explore: 30 minutes
 Explain: 30 minutes
 Elaborate: 60 minutes
 Evaluate: 15 minutes



<p>Missouri Learning Science Standard</p> <p>K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K.PS3.A.1 Make observations to determine the effect of sunlight on the Earth's surface.</p>	<p>Next Generation Science Standard</p> <p>K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.</p>	<p>Science and Engineering Practices (SEP)</p> <p>Planning and Carrying Out Investigations</p> <p>Analyzing Data</p> <p>Modeling</p> <p>Mathematical and Computational Thinking</p> <p>Constructing Explanations and Designing Solutions</p> <p>Engaging in Argument from Evidence</p>	<p>Disciplinary Core Ideas (DCI)</p> <p>Organization for Matter and Energy</p> <p>Flow in Organisms</p> <p>Conservation of Energy and Energy</p>	<p>Crosscutting Concepts (CCC)</p> <p>Cause and Effect</p> <p>Patterns</p> <p>Scale, Proportion, and Quantity</p>
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List of Materials



- 5 infrared thermometers (1 per student group)
- White crew sock (1 per student)
- Black crew sock (1 per student)
- (Optional: 2 black crew socks per student if you wish students to wear socks as paws when they wear their headbands and "become bears.")
- Incandescent bulb in light (one for every 2-3 groups) if it is not warm enough outside
- Bear headbands made during kindergarten Unit Anchoring Phenomenon:
- Habitat activity
- Student Guide and pencil

Engage



- Ask students:

Have you noticed that some colors of clothing make you feel hotter than other colors?

Give your students a few minutes to think about it.

They may say that wearing a black shirt is hotter than wearing a white or light-colored shirt in the summer. If they don't, ask them if they are hotter wearing a black shirt or a white shirt in the summer.

Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Explore



- Give each student a white sock and a black sock.

Note: Crew socks will work the best to demonstrate the heat through hands to the elbow.

Have them put one sock over each hand and up to their elbow. Take students outside on a sunny day. A heat lamp (incandescent bulb) may also be used if you do this indoors. However, you will need to place the bulb where it is hard for students to touch it and remind them that the bulb is very hot.

Can you tell the difference in the temperature on the socks based upon just feel?

What if we took the actual temperature of the socks while they are on our hands?

Discuss how to use an infrared thermometer. Note: If an armored thermometer is used, the temperature readings will be inaccurate.

How does sunlight affect the warmth of the surface of the Earth in a sunny place versus a place in the shade where the sunlight is blocked?



Think back to when we explored sun versus shade in **Lesson 1C**. Refer to your student guide, **Science Notebook Sun — Shade** to review the data collected.

Where was it hottest?

Where was it coolest?

Does the temperature change by the sunlight on the sock?

They should notice that the thermometer is higher (hotter) on the black sock.

Science Notebook	
Sun — Shade Measure and record the temperature in sun and shade. Then fill in the blanks with the word "cool" or "warm."	
	_____ degrees In the shade, it felt _____. Cool Warm
	_____ degrees In the sun, it felt _____. Cool Warm

Explain



- Read aloud from the student guide **Read Together Are All Black Bears Black?** on Page 63.

Are All Black Bears Black?

Missouri black bears often have black fur.

Sometimes black bears are not black.

Look at the photos.

Can you spot which one is blonde?

Can you spot which one is brown?

Tell students that all that work finding food makes bears tired, so they need a nap! Missouri black bears often have black fur, but they can also be blonde, cinnamon, brown, or other darker colors. Look at the pictures of the different black bears in different color phases on the **Read Together Are All Black Bears Black?** on Page 63.

Point out the different colored bears.

Are bears mostly dark or light colored? Do you think the color of a bear's fur has an effect on whether the bear wants to nap in the sun or in the shade when it is hot out? Would a bear get too hot in the sun because of the color of their fur?

Relate this back to when they wore dark and light-colored socks on their arms — like if they had bear paws. Tell them that bears get hot in the sun and may prefer shade to take a nap because their dark fur absorbs more of the sunlight.

Have students look at the pictures of black bears and blonde bears again in their student guide. *Which one do you think will get hotter sleeping in the sun and why?*

Write the following sentence prompt on the board:

The bear with the darkest coat will (get warmer/get cooler) than the blonde bear in the direct sun because _____. Using what we just learned when we were outside, turn and talk to your elbow partner about whether bears with darker coats get warmer or cooler and why. Share your explanation with the class.

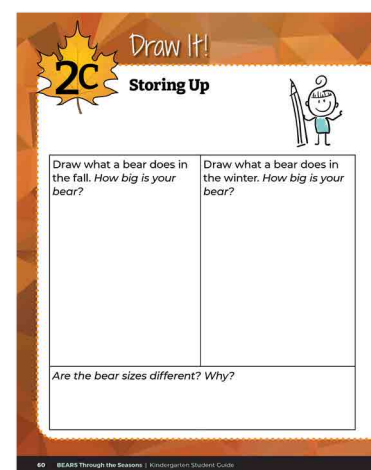
Elaborate



What makes you tired? What do you think will make bears tired?

Think back to our last lessons about why bears eat a lot in the fall. Students can reference their last student journal entry where they explained why bears eat more in the fall to prepare for winter.

Explain that bears spend 20 hours a day foraging for food. Bears will use a lot of energy walking a long way to find food and will eat more in the fall to prepare for winter.



Let's become a black bear in the fall time. Have students wear their bear headbands and black crew socks and tell them that they are now black bears in the fall and are looking for a place to take a nap.



- With their student guides, take students outside to a place with both sunny and shaded areas.

Is there a temperature-taking tool that would help you determine where a bear like yourselves would feel comfortable taking a nap? (thermometer)

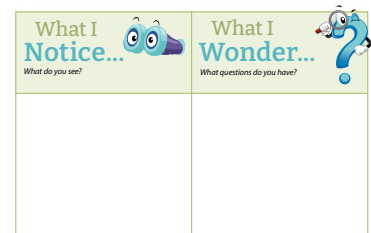
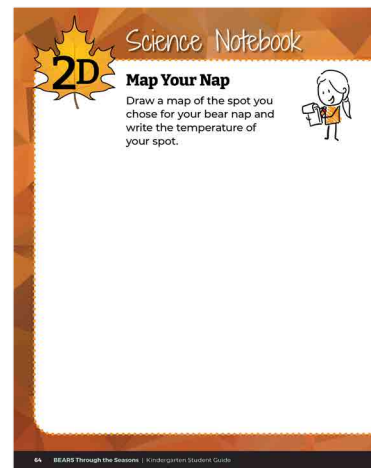
Using what they know about dark colors, have the students find the coolest place to take a nap. Give each student three minutes to find a spot and take the temperature. They need to back up their decision (claim) with evidence from the thermometer to prove the place is appropriate for themselves as a black bear. Once they have found their spot to "nap," have the students take the temperature of the spot they chose using the infrared thermometer, write it down, and complete **Science Notebook Map Your Nap** on Page 64.

Come together as a bear group. Ask students how they can decide, with evidence, which spot is the best (coolest) place for a bear to nap. Have students compare their temperature readings to see which spot is coolest. Visit the top three coolest spots the students discovered.

What are the similarities and differences of each spot?

Tell them they must have evidence (temperatures) that proves one spot is better than another to keep a black bear cool.

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.



Evaluate



- Once inside, write this sentence prompt on the board:

My nap spot was (hotter/cooler) than another spot. I know this because _____. Using what we just learned when we were outside, turn and talk to your elbow partner and share your explanation.

Is there more than one place that a bear would like to take a nap? Why?

Discuss other reasons why a bear may want to nap in the sun or in another spot (for example, warmth during a cool day, closer to habitat needs, etc.)

Cross-Curricular Extensions



Introduce other Missouri animals. Based on what you know about that animal, and what we learned about how sunlight can affect the temperature of that animal, what other Missouri animals like to nap in the shade? What other Missouri animals like to nap in the sun?

Write or draw your animal napping in the shade. Write or draw another animal napping the sun. Why do you think one animal prefers one place to nap than the other animal?



Take It Home

Dear Family,

We are looking for good spots for a black bear to nap based upon temperature. Where is a good spot in your neighborhood for a bear to take a nap? What makes this a good spot?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

We are looking for good spots for a black bear to nap based upon temperature. Where is a good spot in your neighborhood for a bear to take a nap? What makes this a good spot?

Sincerely,

Your Kindergarten Teacher



Finding a Den



Investigative Phenomenon

Black Bear dens serve many purposes in a bear's survival in the way they are shaped and formed.



Estimated Time

Engage: 20 minutes
Explore: 90 minutes
Explain: 30 minutes
Elaborate: 15 minutes
Evaluate: 10 minutes



List of Materials

- Bear finger puppets (1 per group)
- Black bear headbands
- Leaves, twigs, grasses from outside (for students to create a model of a den)
- Clay — 1 stick per group
- Paper plates
- Spray bottle
- Torn pieces of paper to represent precipitation (optional)
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 2E Bear Dens Photo
- 2E Video: *Missouri Black Bear Project — Winter Den*
- 2E Missouri Animals and their Dens Presentation

<div> <div> Missouri Learning Science Standard K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K.ESS2.E.1 With prompting and support, construct an argument using evidence for how animals can change the environment to meet their needs. K.ETS.1.A.1 Ask questions, make observations, and gather information about situations people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K.ETS.1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. K.ETS.1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. </div> <div> Next Generation Science Standard K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. K-2-EST1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. </div> </div>		
Science and Engineering Practices (SEP) Asking Questions and Defining Problems Modeling Planning and Carrying Out Investigations Analyzing Data Mathematical and Computational Thinking Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	Disciplinary Core Ideas (DCI) Types of Interactions Relationship between Energy and Forces Forces and Motion Defining Engineering Problems Organization for Matter and Energy Flow in Organisms	Crosscutting Concepts (CCC) Structure and Function

Engage



- Ask students:

How do you like to sleep in the wintertime?

Do you use a lot of blankets? Does your family turn the heat up, etc.?

What do bears do to prepare for the cold of winter?

Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Explore

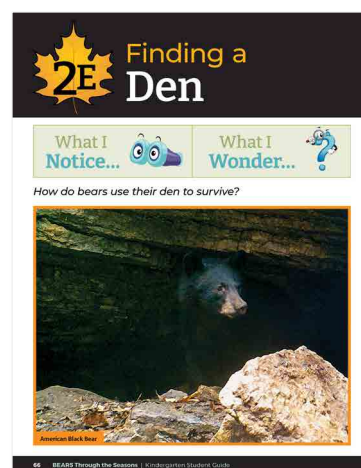


- Open the *MDC Teacher Portal* and go to **Kindergarten Lesson 2E**. Refer to the interactive **Bear Story Map** and display the den types. Students should grab their bear headbands to become a black bear. Distribute bear finger puppets. Tell students they will be making a bear den for their bear puppet.

What kinds of things do they need to make a home for the winter to survive? Take students outside to look around at what locations a bear might look for as they seek a den. Bears search for dens under fallen trees, in caves, inside hollow trees, or may dig out a bigger hole in the ground. Often bears add leaves or grass to the bottom of the den. Let students collect leaves and twigs or other items outside that are safe for them to use to build a space that a bear may use as a den.

Tell students that they are going to create a model of a bear den. *How would building a model bear den help them learn more about how bears survive in the winter?* Bears find dens to stay safely hidden from other animals/humans, and dens protect bears from bad weather. Bear cubs are born in the den.

Students should work in small groups to create a den model for their bear puppets. When they are done with their first prototype, have students do a gallery walk to look at other students' dens. The gallery walk consists of one or two students staying with the group's den to explain their reason for building and shaping their bear den model and to answer questions. The other group member(s) will go to one or two other dens to ask questions and learn about the other dens.



Tell students that they can go back to their groups and make changes to their den. Tell them that they are going to collect evidence to see who has the best den. *What makes a good den?* List student suggestions on the board and begin creating an evaluation tool using those suggestions (stays together, keeps the bear hidden, keeps out bad weather, etc.) Students should also use their observation skills to see which dens hid the bear the best and which den was the strongest (most sturdy).

How do we test what we listed?

Let's test our criteria. Take a paper plate and wave it to make wind. *How does the den hold up?* Use a mister or spray bottle and spray in the air over the den or you can use leaf confetti and drop the bits of leaves over the bear den. *How does the den hold off precipitation?* *Is your bear puppet dry?* Once the first test is done, students can modify their bear den for a second test.

Discuss with the class why some dens worked better than others. Ask students: *What evidence do we have to prove one den was better than another? What was learned from using their den models?*

- Have students open their student guide **Draw It! This Den for the Win!** on Page 67.

On the science notebook page, have students draw the den that was best designed to withstand the weather. Discuss class drawings and have students share which den was a win.

Explain



- Read the **Read Together Bears Use Dens** on Page 68. Have students sing this to the tune of *Frère Jacques* (*Are you Sleeping, Brother John?*).

Bears Use Dens

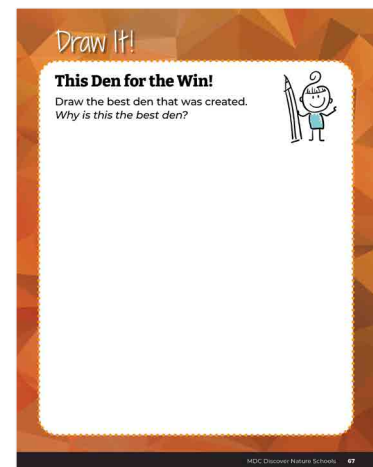
Bears use dens, bears use dens
To survive, to survive
Some have sticks and logs
Some find hollow trees
Bears use dens, bears use dens

- Show **2E Bear Dens Photo** to the students from the **MDC Teacher Portal Kindergarten Lesson 2E**.

Ask students:

What types of dens are bears sleeping in?

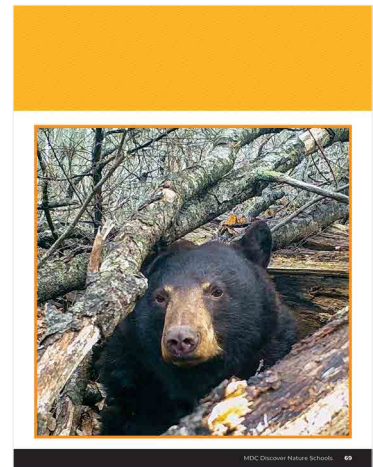
What types of materials from these photos are the bears using?



Explain that bears like to use what is available, like a cave or hollowed-out tree, or even thick brush. It is a misconception that all bears sleep in caves. Some bears may den in a hollowed-out tree, earth den, blowdown tree, or even right on the ground. However, they often must change their environment to make it more suitable.

How could you change a hollowed-out or blowdown tree to make it a better place to spend the winter? How does changing the way something looks help with the way it may work?

Have students explain how the structure and function of dens that bears use help them stay alive through the winter. Talk about how the hollowed-out tree, earth den, or cave gives the den stability (structure) so it stays intact all winter (function).



Elaborate



- Bears may chew sticks, dig out rocks or excess dirt to make more space, or pull in leaves and grass. Bears do not actively build a structure like a beaver would.

What other animals in Missouri use dens for the winter? Display **2E Animals and Their Dens** from the *MDC Teacher Portal*. **Teacher Note:** Beavers and muskrats build their lodges and huts. These are similar to bear dens in that the animals spend the winters there, but beavers and muskrats stay active all winter and their homes are called different things. Also, lodges and huts are used year-round whereas dens are used by bears only in the winter.

Look at beavers or muskrats and how they build their dens. *How do their dens compare to bear dens?* Have students compare those dens to the dens of bears.

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Evaluate



- Assess student guides with den drawings and have students explain why they designed it that way. Students should include structure understanding such as: Dens should be made of things from nature like trees, caves, rocks, leaves, and tree branches.



Take It Home

Dear Family,

Find a rotting log outside. Carefully roll the log towards you so you can look underneath it. What do you find? Now look at a living tree. What do you find there? How is the rotting log different from the living tree? How have the animals inside of the log changed the log?

Make your own bear den at home! Ask a family member for a large box and create your own den. What materials can you use to represent what a bear may use in nature?

How is your home or bedroom like a bear's den? What do you have that helps you rest? What other animals make use of dens in winter? Ask your family to list animals they think use dens.

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Find a rotting log outside. Carefully roll the log towards you so you can look underneath it. What do you find? Now look at a living tree. What do you find there? How is the rotting log different from the living tree? How have the animals inside of the log changed the log?

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How is your home or bedroom like a bear's den? What do you have that helps you rest? What other animals make use of dens in winter? Ask your family to list animals they think use dens.

Sincerely,

Your Kindergarten Teacher



Winter

Lessons at a Glance

Suggested Lesson Timeline for Unit 3 Winter

The following lessons are intended to start at the conclusion of Unit 2 in November and conclude by the beginning of February. **Note:** Order your seeds now for **Spring 4B Sprouting Seedlings** activity where students are growing flowers from seeds.

- Lesson 3A: 2.5 hours + additional daily observation time
- Lesson 3B: 2 hours
- Lesson 3C: 3 hours
- Lesson 3D: 2.5 hours

Related Reading Texts to Support Unit 3 Content

Lesson 3A:

Markle, Sandra. (2018). *Hush Up and Hibernate*. Apex, North Carolina. WunderMill Publishing Group. 36 pages. ISBN-13: 9781943978526.

VanVoorst, Jennifer Fretland. (2016). *Animals in Winter*. Minneapolis, Minnesota: Bullfrog Books. 24 pages. ISBN-13: 9781620314975.

Lesson 3C:

Boothroyd, Jennifer. (2014). *What is Severe Weather?* Minneapolis, MN: Lerner Publishing. 24 pages. Lexile 470L. ISBN-10: 1467744999.

Lesson 3D:

Stewart, Melissa. (2019). *Under the Snow*. Atlanta, GA: Peachtree Publishing Company. 32 pages. Lexile 780. ISBN-10: 1682631257.

Unit 3:

Rotner, Shelley. (2018). *Hello Winter!* New York, NY: Holiday House. 32 pages. Lexile: 490L. ISBN-10: 0823439763.

Unit Phenomenon



As the amount of daylight decreases, bears are less active in the wintertime and will hibernate to save energy when food is scarce. During this time, cubs are born and even through harsh winter conditions, they must survive.

Essential Statements for Unit 3

- I can list some of the weather challenges of winter.
- I can explain how my body responds when I become more active (increased heart rate and breathing).
- I can make a model of a structure.
- I can draw a shelter and explain what materials work well.
- I can identify severe weather including blizzards and thunderstorms.

Essential Questions for Unit 3

- What do bears and other animals do to survive through the winter?
- What are good qualities of a shelter that will keep animals and people safe during severe weather?

Unit 3 Vocabulary

Available — ready to use (lesson 3D)

Comparison — to look at different things and see how they are the similar and different (lesson 3A)

Cub — young animal that eats meat (lesson 3B)

Safe — not able to be hurt, no danger (lesson 3C)

Sense — the way you learn about the world: touch, taste, sight, smell, and hearing (lesson 3D)

Storm — heavy rain, sometimes with lightning and thunder (lesson 3C)



Surviving the Cold



Investigative Phenomenon

As the amount of daylight decreases and winter sets in, food becomes scarce. Bears need to make sure that their needs are met during this cold season.



Estimated Time

Engage: 20 minutes + 10 minutes x 20 days
Explore: 45 minutes
Explain: 30 minutes
Elaborate: 20 minutes
Evaluate: 20 minutes

Missouri Learning Science Standard K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.		Next Generation Science Standard K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Analyzing and Interpreting Data Mathematical and Computational Thinking Constructing Explanations and Designing Solutions	Disciplinary Core Ideas (DCI) Organization for Matter and Energy Flow in Organisms	Crosscutting Concepts (CCC) Patterns Cause and Effect Scale, Proportion, and Quantity



List of Materials

- Chart paper (optional)
- 3A Daily Weather Data Chart
- 3A How Many Breaths? Chart
- Book: *Hush Up and Hibernate* by Sandra Markle
- Book: *What Happens in Winter? Animals in Winter* by Jennifer Fretland VanVoorst
- Student Guide and pencil
- Black bear headbands

Engage



► Ask students:

What do bears do in the fall to prepare for winter? (Find dens, eat a lot)

Why do bears need to prepare for winter? (Less food, very cold.)

What do people do to survive in the winter? (Stay in a warm house/school, wear warm clothes.)

In the student guide, have students look at the pictures in the **Unit 3 Introduction** on page 70 and the **Talk About It** on page 71. Ask students:

What season is this?

How do you know?

Will this season be different for bears? How?

Read aloud from the student guide **Read Together Surviving the Cold** on Page 74.

Surviving the Cold

In winter it is cold.

In winter, there is less sunlight.

Many animals need plants to eat to live.

With less sunlight and warmth,

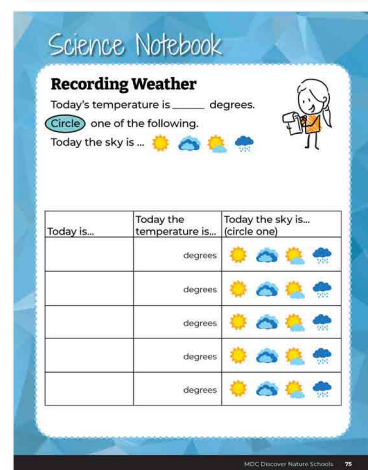
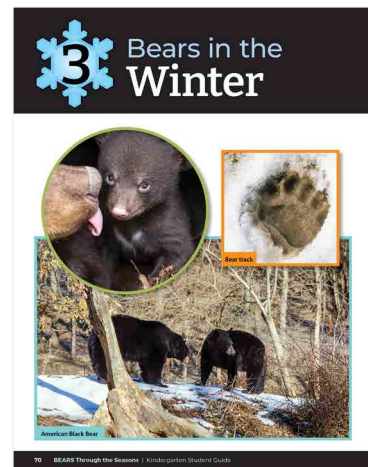
There are less plants for animals to eat in winter.

It's time to collect our seasonal weather data. As a class, go outside with the student guides to record the temperature and collect weather data. Record findings in the student guide **Science Notebook Recording Weather** on Page 75.

- Refer to the **3A Daily Weather Data Chart** at the end of this lesson. Each day, week, or designated time data is collected as a class, have students record findings on the **Daily Weather Data Chart**. You may post a larger version of this chart to the front of the class. If additional copies are needed throughout the year, photocopies can be made and distributed to students.

Collect additional data and determine when it will be filled out each day. *How will days that have some rain or some sun be reported?*

Optional — Collect data for 4 weeks. If this option is chosen, continue to use the **Daily Weather Data Chart**, a 4-week data collection tool. Students can draw the weather and record the temperature in the boxes — decide what symbols to use for recording. Ask students why they should all use the same symbols to record. After a week of data collection, discuss how the weather has changed over the course of the week. Has there been a lot of change or a little change? Has it occurred fast or slow? There may be rapid change in weather when storm systems come in. Seasonal changes occur more slowly.



- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Explore



- Ask the students to sit very still without talking.

Step 1. Tell them that they are going to count their breaths for 20 seconds after doing three different activities for 1 minute. Tell them that the first time they do it they will be sitting very still, the second time, they will be walking in place, and the third time they will be running in place.

Step 2. Using the **Science Notebook How Many Breaths?** chart template, draw the chart onto the whiteboard or chart paper for the class to view. Ask students to predict how many breaths they will take each time. *Do you think the number will be the same or different for each activity?* Have students record their predictions on the whiteboard or on chart paper.

Step 3. Next, have students do each activity for 1 minute, stopping to count how many breaths they take in 20 seconds after each activity. Time the students and tell them to remember how many breaths they took. After the 20 seconds, have them feel their chest to see how fast their heart is beating.

On the whiteboard record how many breaths each student took. Using the **How Many Breaths?** chart, take the most common number of breaths taken by each student and graph that number onto the classroom chart. Have the students compare the quantities in each column and record the class data into their student guide **Science Notebook How Many Breaths?** chart on Page 76. Ask students:

What patterns do you notice in your breathing and heart rate?

What do the numbers tell you?

When do you think you were using the most energy?

Students circle the activity in their student guide.

What are the effects of using more energy when we ran?

Discuss the cause-and-effect relationship.

When we run, we burn more energy.

What activity would burn the least energy, but you could do it for longer periods of time? (Sitting)

Is sleeping an activity? Why or why not? Do we use energy when we sleep? Do you wake up hungry sometimes? Why?

Think back to when we weighed the bags of beans or rice in **Lesson 2C Wow! Bears Eat A Lot!**

Science Notebook

3A

How Many Breaths?

Do each activity for one minute. Count your breath after each activity for 20 seconds. As a class, what was our most common number of breaths? Record the class number.

Number of Breaths	Sitting	Walking	Running
30			
28			
26			
24			
22			
20			
18			
16			
14			
12			
10			
8			
6			
4			
2			

When do you think you were using the most energy? While I was... circle one: sitting walking running

76 BEARS Through the Seasons | Kindergarten Student Guide

Which season showed bears eating the most food (Fall) and which season showed bears eating little to no food? (Winter).

Have students open their student guide and turn back to **Draw It! Storing Up** on Page 60.

Why do bears eat a lot of acorns and other food in the fall? (Store fat for the winter to use as energy to survive while they sleep for months.)

Explain



- Read the book *Hush Up and Hibernate* by Sandra Markle. *What do bears do in the wintertime to conserve energy?* (Hibernate) *What were some of the reasons Mama Bear said why bears needed to hibernate?* (Food availability and to avoid predators)

Tell students that some animals go into deep sleep and do not wake up for days, weeks, or months. This is called **hibernation**. Other animals will sleep deeply but will wake up if needed. This is called **torpor**.

Teacher Note: You may teach either the concept of hibernation or the concept of torpor to your students, depending on their level of understanding. This lesson uses the term hibernation as this is the term most understood by this grade level.

Hibernation versus torpor: Both are similar in that animals use a lot less energy, their heart rate decreases, and they breathe less. However, there are some differences between the two. Animals that hibernate go into a long and deep sleep all winter and don't wake up. Smaller animals are the only true hibernators. Bears don't truly hibernate; they go into a state of torpor. Animals that go into torpor are asleep, but it is not as deep of sleep or as long. They can still quickly wake up if danger is around or, in the case of bears, to give birth. Animals in a state of torpor will wake up if they sense food or if the weather warms up for a day or two.

- Discuss the results of their breathing/heart rate activity again from student guide **Science Notebook How Many Breaths?** on Page 76.

In which portion of the activity did you use less energy? While you were sitting, walking, or running?

Think back to the book *Hush Up and Hibernate*.

When Mama Bear and Cub finally went into their den, how did they act?

What causes bears to hibernate? (Not much food available so they need to conserve energy.)

Why are they able to stay alive while they hibernate? (Bears eat a lot in the fall to build up fat to survive in the winter since they are sleeping.)

Draw It!
Storing Up

Draw what a bear does in the fall. How big is your bear?

Draw what a bear does in the winter. How big is your bear?

Are the bear sizes different? Why?

3A Science Notebook
How Many Breaths?

Do each activity for one minute. Count your breath after each activity for 20 seconds. As a class, what was our most common number of breaths? Record the class number.

30			
28			
26			
24			
22			
20			
18			
16			
14			
12			
10			
8			
6			
4			
2			
	Sitting	Walking	Running
	Activity		

When do you think you were using the most energy? While I was... circle one: sitting walking running

Discuss the cause and effect of the weather and decreasing amount of daylight on the amount of food present for animals. Refer to student guide **1B Science Notebook Weather Data** page and **2A Science Notebook Weather Data** page.

What was the weather like during the summer? during the fall? during this season?

How does the weather effect plants? How does having less food affect some animals?

Elaborate

Do all animals hibernate?

- Read the book *What Happens in Winter? Animals in Winter* by Jennifer Fretland VanVoorst. Ask students:

What techniques have we learned that animals use to survive winter? What do frogs do to survive the winter? (They survive underwater.) What do foxes do? Thinking back to Hush Up and Hibernate, what do wolves and mountain lions do? (They hunt.)

Do all animals that we've discussed spend the winter here in Missouri? What were the geese doing in the beginning of the book? Why? (They were flying south to avoid the colder temperatures.) What is happening around them that makes them change their behavior?

Think about our weather data we've taken earlier this lesson. How is this different from our weather data in the fall and summer? (Less available food and colder temperatures.)

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes.

Evaluate

Have students complete student guide **Draw It! Winter Activities** on Page 77. Students will draw what a bear does in the winter and what they do in the winter. Discuss how the activities are the same or different. Review why a bear hibernates and the activities of a human during the winter. (We spend more time indoors because of the weather and shorter days, but we don't need to conserve energy the way a bear does because our food supply remains available.)

Cross-Curricular Extensions

Act it Out! Grab your bear headbands and perform the actions from *Hush Up and Hibernate* by Sandra Markle.



Recording Weather
Today's temperature is ____ degrees.
Circle one of the following.
Today the sky is ...

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	
	degrees	
	degrees	
	degrees	
	degrees	

2A Science Notebook
Recording Weather
Today's temperature is ____ degrees.
Circle one of the following.
Today the sky is ...

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	
	degrees	
	degrees	
	degrees	
	degrees	

Draw It!
Winter Activities
Draw a picture of what a bear does in the winter. Draw a picture of what you do in the winter. How are the activities the same or different?

Bear in Winter	Me in Winter

What I Notice...	What I Wonder...



Take It Home

Dear Family,

Look out the window of your home or take a walk around your neighborhood. What animal signs do you find during your walk? What Missouri animals do you see or hear that are still active in the wintertime? Do you see or hear a difference in activity from winter to summer?

With your family, discuss how you prepare for winter. What steps does your family take to stay warm? Do you have more needs in winter? How do you know what the weather will be like?

Discuss with your family ways that you prepare for cold weather and how it is different and/or the same as the ways an animal prepares for winter.

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Look out the window of your home or take a walk around your neighborhood. What animal signs do you find during your walk? What Missouri animals do you see or hear that are still active in the wintertime? Do you see or hear a difference in activity from winter to summer?





















With your family, discuss how you prepare for winter. What steps does your family take to stay warm? Do you have more needs in winter? How do you know what the weather will be like?

Discuss with your family ways that you prepare for cold weather and how it is different and/or the same as the ways an animal prepares for winter.

Sincerely,

Your Kindergarten Teacher

Daily Weather Data Chart

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	   
	degrees	   
	degrees	   
	degrees	   
	degrees	   

How Many Breaths?

Do each activity for one minute. Count your breath after each activity for 20 seconds. As a class, what was our most common number of breaths? Record the class number.

Number of Breaths	30			
	28			
	26			
	24			
	22			
	20			
	18			
	16			
	14			
	12			
	10			
	8			
	6			
	4			
	2			
		Sitting	Walking	Running
		Activity		



New Cubs!



Investigative Phenomenon

As the amount of daylight decreases and winter sets in, food becomes scarce. Bears need to make sure that their needs are met during this cold season.



Estimated Time

Engage: 20 minutes
Explore: 30 minutes
Explain: 20 minutes
Elaborate: 20 minutes
Evaluate: 10 minutes

Missouri Learning Science Standard		Next Generation Science Standard	
K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.		K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Analyzing and Interpreting Data Mathematical and Computational Thinking Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information		Disciplinary Core Ideas (DCI) Defining and Delimiting an Engineering Problem	Crosscutting Concepts (CCC) Patterns Cause and Effect



List of Materials

- Stuffed bear with 8-ounce weights added (Suggestion: Add weights if object does not meet 8 ounces)
- Item that weighs 6–8 pounds (example: 2 bags of flour/sugar)
- Student Guide and pencil
- Media player or computer to play the vocalizations



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 3B Link: Recordings of bear noises
- 3B Bear Pictures

Engage



- Ask students:

How big were you when you were first born?

Pass around a stuffed animal bear (or small item weighing about 8 ounces) and tell students that it represents a newborn cub. Most baby humans weigh 6–8 pounds. Pass around something that is about 6–8 pounds. By the time spring comes, the cubs are about 6 pounds. Tell the students that since their mothers are hibernating, they will wake up in the winter (January) to give birth to their cubs. Cubs are born helpless, just like humans, so it is important that they start growing fast to survive. The mother bear produces milk that is high in fat. This helps cubs to grow quickly. When they get a little bigger, they are able to leave the safety of the den and just like when babies learn to walk, they can travel to other places. Since cubs are little, there are many things that they need to learn in order to survive, just like humans.

- Ask students:

What kinds of things did you learn when you were little that kept you safe?

What kinds of things do you think cubs need to learn? (When to know there is danger, how to find food, find a shelter, etc.)

- In the student guide, **Read Together Mama Bear** on Page 79.

Mama Bear

Mama bear, mama bear,
Where are you?
Baby bear, baby bear,
Here with you.

You can hear me by my sound,
Letting you know that I'm around.
Baby bear, baby bear, listen for me
That will keep you safe you see.

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Tell students that they are going to hear three different vocalizations (noises) that a mother bear can make to help teach her cubs to be safe and survive. Take your students outside for this activity if possible. Set clear boundaries where students can and cannot go. Tell the students that they are going to be bear cubs and you are going to be the mother bear.



- Play recordings of bear noises (stamping feet or jaw popping, snorting, grunting) on your phone or Smart Device. Recordings can be found on the *MDC Teacher Portal* under **Kindergarten Lesson 3B**. Before you start the activity, play each sound one at a time and tell the students (cubs) what to do if they hear that sound.

Play the bear stomping its foot or popping its jaw.

What do you think the mother bear is trying to say to the baby bear?

(Tell students it means that there is danger nearby. Tell them that natural predators like coyotes and bobcats as well as dogs, people, and cars can be a danger to small cubs.)

These vocalizations serve as a warning to the danger. Explain that mother bear will teach the cubs to climb a tree with rough bark because it's easy to climb. If there is a tree nearby like that, tell students to touch the tree if they hear that noise. If a tree is not available, come up with an area that represents the tree. Mother bear will grunt at the cubs when it is safe to come down.

Play the next noise, snorting.

What do you think the mother bear is trying to say to the baby bear?

(Tell them that the mother bear is trying to teach them something important that they need to pay attention to.)

What kinds of things could the mother bear be trying to teach them

(how to find food, climb trees, follow her, etc.)? What should the cubs should be doing if they hear the mother bear snort? (Tell them they should be still and quiet so they can follow directions.)

Play the last sound, grunting.

What do you think the mother bear is trying to say to the baby bear?

(Tell them it means that things are peaceful.)

What do you think the cub will do when it hears the sound? (Tell

them the cubs will play with each other or snuggle with their mother. Tell them to gather together as if they were going to play if they hear that noise.)

Have the students practice making each sound.

Now, play each noise several times in a random order. The students should pretend they are cubs and do the activity that matches the sound of the mother bear (stomp foot or jaw popping — go to tree, snort — stop and be quiet, grunting — gather with the other cubs to play). Ask students what patterns they notice for the sounds the mother bear makes (louder and more urgent to quieter and calmer to match the situation).

Explain



- Tell students that sound is an important tool that mother bears use to keep their cubs safe. You may note to your students that bears will also teach their cubs by showing and may not vocalize as much as many other animals. Ask students how their parents/guardians and other adults let them know when danger is present. What should they do if there is danger present (busy street, stranger, etc.)?

How do they know that their family and/or teachers are trying to teach them something?

How do they know when it's time to learn?

What should they be doing?

How do they know it is safe to play? What are their family and/or teachers doing during that time?

Do you notice any patterns in the volume and urgency of your families' voices?

How does it compare to the mother bear's voice?

How does the way you learn from your family compare with how cubs learn?

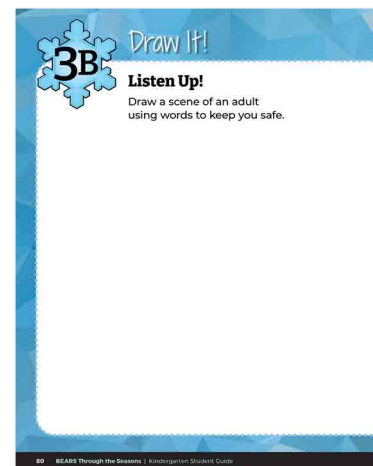
What is the effect on the bear cubs when the mother pops her jaw? Grunts? Snorts?

How do they react?

Discuss the cause-and-effect relationship on the students' behavior when their parents/guardians use a certain tone or volume of voice.

- Use the student guide **Draw It! Listen Up!** on Page 80.

Have students draw a scene showing an adult using words to keep them safe.



Elaborate



How do mother bears use sounds with their cubs? (Keep their cubs safe, teach them how to survive, and let them know it's safe to play.)

What else does a mama bear do to teach her cubs to survive? (As a mother bear finds food, the cubs see what she eats and where to find it.)

Divide students into pairs. Assign each student in the pair to be either a mother or cub. Mother bear will be asked to communicate and teach their cub to learn what the following sounds mean. Tell the students that they are to develop a set of code sounds, (for example, grunts, long grunts, growls, and snarls) for the following commands:

- "Come here, baby cub." (example: harsh, sharp, or loud growl)
- "All is well, lie down and rest." (example: grunt sound or low rumble)
- "Danger, stop!" (example: stomp feet or pop jaw)

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate

- Show students images of the different bears from the *MDC Teacher Portal* under **Kindergarten Unit 3B**.

Have students pretend they are the mother bear. *What sounds would the mother make during each scene?* Students should make the correct sound.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Cross-Curricular Extensions

Invite the school nurse or community safety person (emergency response or health care worker) to your classroom to share how their work helps ensure people in the school or community stay safe. Have them discuss how they communicate safety needs when working with others.

Invite someone who cares for animals (veterinarian, zoo, animal shelter, or conservation staff) to share how their job helps ensure animals stay safe.





Take It Home

Dear Family,

Discuss with your family what sounds you may hear at home that signal danger (for example, smoke alarm, tornado siren, etc.) and what you do in response to those signals. How does your family respond to those signals to protect you? What other vocalizations does your family use to signal that food is ready, it's playtime, or it's bedtime?

With your family, discuss how animal mothers communicate with their young. What kinds of things do they communicate to help meet their babies' needs?

How do you communicate as a family?
How does your family warn you of danger?
Prepare you for bed?
Let you know how to be safe?
How are animal mothers similar?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Discuss with your family what sounds you may hear at home that signal danger (for example, smoke alarm, tornado siren, etc.) and what you do in response to those signals. How does your family respond to those signals to protect you? What other vocalizations does your family use to signal that food is ready, it's playtime, or it's bedtime?

With your family, discuss how animal mothers communicate with their young. What kinds of things do they communicate to help meet their babies' needs?

How do you communicate as a family?
How does your family warn you of danger?
Prepare you for bed?
Let you know how to be safe?
How are animal mothers similar?

Sincerely,

Your Kindergarten Teacher



Surviving a Storm



Investigative Phenomenon

As the amount of daylight decreases and winter sets in, food becomes scarce. Bears need to make sure that their needs are met during this cold season.



Estimated Time

Engage: 30 minutes
Explore: 60 minutes
Explain: 15 minutes
Elaborate: 30 minutes
Evaluate: 15 minutes
Extend: 20 minutes

Missouri Learning Science Standard

K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and animals can change the environment to meet their needs.

K.ETS.1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K.ETS.1.C.1 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Next Generation Science Standard

K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Science and Engineering Practices (SEP)

Asking Questions and Defining Problems
Planning and Carrying Out Investigations
Analyzing and Interpreting Data
Modeling
Mathematical and Computational Thinking
Constructing Explanations and Designing Solutions
Obtaining, Evaluating, and Communicating Information
Engaging in Argument from Evidence

Disciplinary Core Ideas (DCI)

Natural Hazards
Defining and Delimiting an Engineering Problem
Developing Possible Solutions
Optimizing the Design Solution

Crosscutting Concepts (CCC)

Structure and Function
Stability and Change



List of Materials

- 3C Family Cut-Outs Sheet
- 3C Homes of Missouri Animals page
- Book: *What is Severe Weather?* by Jennifer Boothroyd
- One bag of flour
- One copy of a paper family per group (samples in the slideshow)
- Sifter to help pour the flour
- Water
- One cup (to pour water)
- Various materials to build shelters:
 - Modeling clay
 - Cardboard
 - Aluminum foil
 - Sticks
 - Rocks
 - Paper
 - Leaves
 - Plastic wrap
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 3C Short clip of a weather forecast that is predicting severe weather
- 3C Video: *How Plants and Animals Change Their Environment*

Engage



- Read *What is Severe Weather?* by Jennifer Boothroyd. Ask students if it is safe for them to be outside when we have severe weather.

How do we know when unsafe weather is coming?

Can we tell by how the sky changes?

What does it look like?

Is there anything that can warn us in advance that a storm is coming?

- Read aloud together from the student guide **Read Together Be Prepared** on Page 83.

Be Prepared

The wind blows fast
We look and see,
The sky turns dark
For bears and me.

The air is cold
Safe home we run.
Bears are safe,
In their den when
the storm is done.

- Show students a short clip of a weather forecast that is predicting severe weather (play an online recording from the *MDC Teacher Portal Kindergarten Lesson 3C* link). What questions would you have about the forecast? Discuss their questions.

Ask students:

What should we do if we know severe weather is coming our way?

What should we do during a thunderstorm? (Go inside, stay away from trees, etc.)

A blizzard? (Go inside, get blankets in case electricity is lost, etc.)

A tornado? (Go to a basement or center/small room of a house like a bathroom, etc.)

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

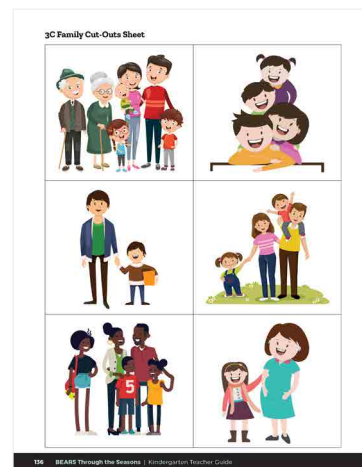


Explore

- Tell students that for people to stay safe from severe weather, they need to build structures that will keep them safe. Tell students that they are going to have to build a model of a house that will keep the people inside dry and safe from severe weather.

Divide students into groups of 2–3 to build a structure together. Give each group paper cut-outs from the **3C Family Cut-Outs Sheet**.

Tell them that the shelter should just be big enough to keep the family dry and safe. Have a wide variety of materials available for the students to create a small shelter. Tell them that they need to



make sure that no water or snow can get in their buildings. Also, water and snow shouldn't be allowed to accumulate on the roof of their structure because it could get heavy and collapse. This is especially true with snow. Give the students time to build their structure. Put the structures in a plastic shoe box or in a sink to help with clean up.

1. Sprinkle 1/4 cup of flour over the structure first to make sure snow can't get in or accumulate on the roof.
2. Then, pour a cup of water over the shelter to make sure the family stays dry.
3. Have students check their family to make sure they didn't get wet or have snow on them.
4. Have students discuss the shelter designs and why they think some worked better than others.

Explain



Ask students:

Do storms develop quickly or slowly?
What about a tornado or hail that forms during a storm?
Does it develop quickly or slowly?

The weather can be stable for a while (same every day), but severe weather can change quickly. *How do weather forecasts help us prepare?* (They give us time to take shelter.) If we didn't have weather forecasts, then we wouldn't have as much time to prepare.

Both animals and people have learned to use their environment to protect themselves from unsafe weather. We build houses made of brick, stone, and siding that are strong and sturdy. Most roofs have a tilt to them so snow and rain can run off.

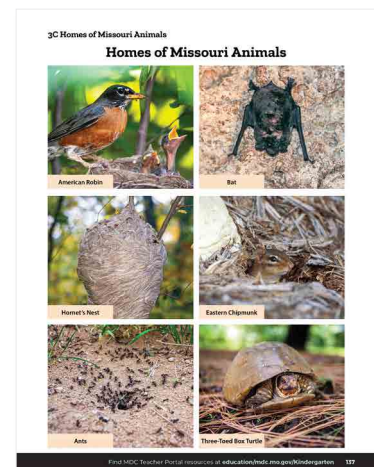
Did the materials and the shape of the roof help in keeping your family safe and dry during the storm?
What worked best? Why?
What didn't work as well? Why?

Elaborate



- Refer to **3C Homes of Missouri Animals** page at end of this lesson in the teacher guide. Compare the materials and designs of various animal shelters (Missouri animals) to that of shelters that humans build:

How are the structures we build as humans like these animal structures? How are they different? Discuss with the students how each shelter can protect the living things inside of it.



How do these shelters compare to a bear's den? Discuss how each will handle rain or snow (a robin's nest will let the rain go through and the tree's leaves/branches protect it; the bat is in a cave with safe sturdy walls; ants and chipmunks go below ground where they are safe; turtles use their curved shells as a home; hornets create nests that let rain and snow slide off much like it would on a house's roof).

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Evaluate



- In the student guide **Science Notebook A Safe and Snug Shelter**, using what they've learned, have students draw a shelter that will keep a family safe. Divide students into small groups to share their design and have them explain why this shelter will keep their family safe.

Science Notebook

3C A Safe and Snug Shelter

Thinking about what we learned in our experiment, draw a shelter that will keep a family safe and dry from severe weather.

Why do you think this is the best shelter?

Extend



- Tell students that when animals and people build shelters, they change the environment. They do so by moving things around, taking materials from one place to another. **How do humans and animals move materials to build their shelter?** (People use wood from trees to build houses, animals use twigs and leaves to build a nest.) Tell students that animals can change their environment for other reasons besides just building a shelter. Tell them that plants can too!

On the *MDC Teacher Portal* go to **Kindergarten Lesson 3C** to watch the *How Plants and Animals Change Their Environment* video.

Cross-Curricular Extensions

Weather Report–Role Play: Tell students they will each get a turn to be a television weather reporter. Small props such as a toy microphone, chalkboard, or whiteboard can be used.

Give each student a specific type of weather forecast and let their imaginative play begin. Let them role play, discussing how they will inform or warn the audience of severe weather, perhaps including what clothing attire to dress in for the upcoming weather.





Take It Home

Dear Family,

Take a walk outside with your family. See if you can find at least five different animal shelters. How do these shelters keep the animals dry during severe weather like thunderstorms, hailstorms, or snowstorms?

With your family, watch a local weather forecast.

What information did they tell you?

How will that information help you prepare for the next day's weather?

Did they give you information to plan for your week ahead?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Take a walk outside with your family. See if you can find at least five different animal shelters. How do these shelters keep the animals dry during severe weather like thunderstorms, hailstorms, or snowstorms?

With your family, watch a local weather forecast.

What information did they tell you?

How will that information help you prepare for the next day's weather?

Did they give you information to plan for your week ahead?

Sincerely,

Your Kindergarten Teacher

3C Family Cut-Outs Sheet



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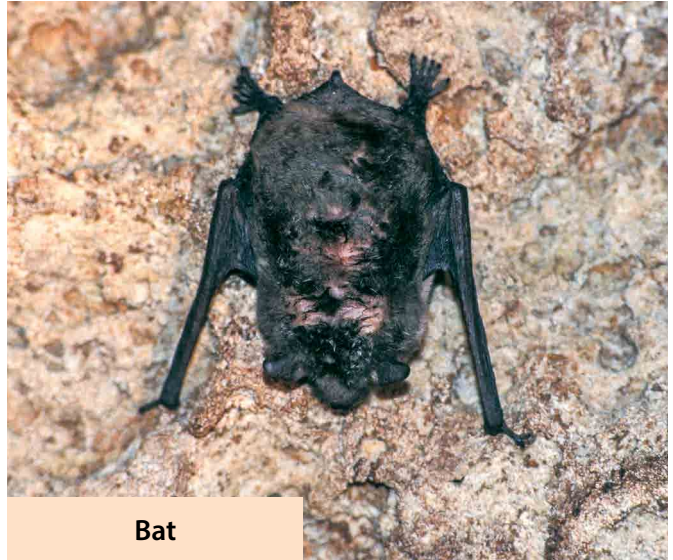


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Homes of Missouri Animals



American Robin



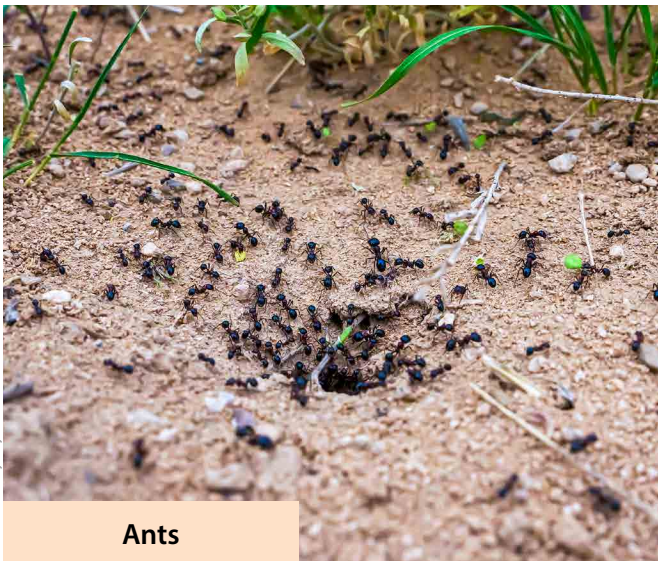
Bat



Hornet's Nest



Eastern Chipmunk



Ants



Three-Toed Box Turtle

Ants: ©Elvira Tursynbayeva/Shutterstock.com



Wake Up, Hungry Bears!



Investigative Phenomenon

As the amount of daylight decreases and winter sets in, food becomes scarce. Bears need to make sure that their needs are met during this cold season.



Estimated Time

Engage: 20 minutes
Explore: 45 minutes
Explain: 15 minutes
Elaborate: 30 minutes
Evaluate: 15 minutes
Extend: 15 minutes

Missouri Learning Science Standard		Next Generation Science Standard	
K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.		K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.	
Science and Engineering Practices (SEP) Asking Questions and Defining Problems Planning and Carrying Out Investigations Analyzing and Interpreting Data Modeling Mathematical and Computational Thinking Constructing Explanations and Designing Solutions		Disciplinary Core Ideas (DCI) Organization for Matter and Energy Flow in Organisms Biogeology Defining and Delimiting an Engineering Problem Developing Possible Solutions	Crosscutting Concepts (CCC) Patterns Cause and Effect



List of Materials

- 3D Token Cut-Outs page
- 5 boxes or jars (large enough to put in 5 tokens and cotton balls with scents on them, either as a liquid extract or as a spice or herb). Be sure to consider any food or medical allergies of your students before choosing your scents. Suggested scents include: cinnamon, cumin, garlic powder, cocoa powder, ground mustard, and extracts (vanilla, pineapple, banana, almond, orange, peppermint)
- 12 tokens for the nut (almond) box or jar
- 2 tokens for the strawberry box or jar
- 2 tokens for the raspberry box or jar
- 1 picture of raspberry, 1 picture of strawberry, 1 picture of almonds
- 10 small envelopes (one for each scent inside the boxes or jars and one for each scent to be passed around)
- Book: *Under the Snow* by Melissa Stewart

Engage



- Tell students that winter is almost over and spring is near. Read aloud from the student guide, **Read Together A Nose for Food** on Page 87.

A Nose for Food

When bears wake up, they are hungry.
Are you hungry when you wake up?

Many of a bear's favorite foods are not available in winter.
They must use their nose to smell food nearby.

- Discuss with students how winter affects a bear.

Wintertime for students may seem to drag on, as they may not go outside as often to play. Bears feel the same way sometimes. If there is an unusually warm day in winter, they may leave their dens in search of a snack. However, dead leaves and snow cover the ground. Bears have poor eyesight, but they have a strong sense of smell. They use this smell to find acorns and other foods. Ask students:

How do you think bears can find food in the winter if they happen to go out? Let's see if you can name each of your senses. *Which sense do you think is the best for a bear?*

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.



Explore



- You will need five small boxes or jars. Copy and cut **3D Token Cut-Outs** page from the handout following this lesson. Three of the boxes or jars will have pleasant scents of food in them that a bear might eat (raspberry extract, strawberry extract, almond extract, etc.), and two will have unpleasant scents (white vinegar, apple cider vinegar, etc.). Put several drops of extract onto a cotton ball so it has a heavy scent. Put the cotton balls in a small envelope that will sit on top of the box so students will be able to smell the scents. Put 12 tokens in the box or jar representing the nuts (almonds), 2 tokens into the box or jar representing raspberries, and 2 tokens into the box or jar representing strawberries. Do not put any tokens in the boxes/jars that do not have a pleasant smell. Hide the boxes or jars with the correct envelopes on top inside or outside the classroom. Tell students that they are going to be bears looking for food. They are going to answer two questions:

What kinds of foods do bears look for to eat?

How will a bear find those foods? (Smell, sight, use their paws to dig.)



- Have a second set of the cotton balls (for all five boxes/jars) for the students to smell before they go find the boxes/jars with the scented cotton balls and tokens in them. Put those cotton balls in their own envelopes so they are easy to pass around.

Tell students that they will have to use the same methods a bear would use. Let them smell each of the three pleasant smells and show their picture. Tell students that when they look for food, they are going to find a token in the box. The tokens are a model representing the amount of food there is for each type. The more tokens, the more of that food.

Of each food, what do you think you will find the most of? Make a chart of their predictions.

Before you start the activity, ask students what questions might be able to be answered (what bears eat, how they find it, how much of each food they eat). Write their questions on the board.

Ask students:

What kinds of data should we collect in order to answer our two questions?

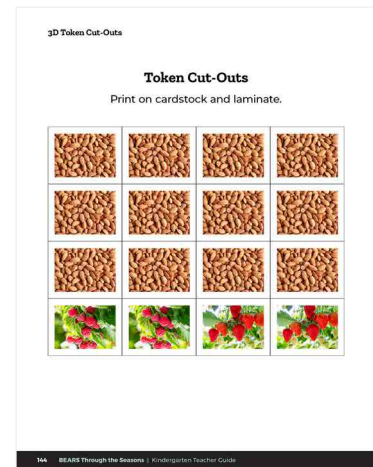
What kinds of foods do bears look for to eat?

How will a bear find that food?

Note: This activity can be done outside or in the classroom. Before students come into your classroom or go outside, you will need to hide the five boxes or jars of scents. Hide them under things like leaves if outside or a piece of cloth or paper if in the classroom. Make sure you tell students the boundaries of where they may and may not go.

- Give students 2–3 minutes to search for the different scents. If they find it, they will pull one token out of the box. Tell them that there are only so many tokens, so only the first to find the food will get a token.

Review at the end: If they open a box or jar and smell the unpleasant smell, they will have no tokens to collect. Why? Because a bear may not be interested in that food. What was their favorite scent? Have students bring their tokens to you when they find one.



Explain



- Berries are available during warmer times of the year. However, there may be some leftover acorns or roots that bears will eat in late winter or early spring.

Animals with wet noses have a better sense of smell. Bears have wet noses, so they have a good sense of smell. They use that sense of smell year-round to find food. However, bears have fairly small eyes

and only see well up close. Sometimes they will stand on their back legs to look around, but they use their sense of smell the most to find food. Ask students to look at the types of tokens they found.

Ask them:

What were the tokens a model for? (Food a bear would eat.)

Why were there only a few tokens in each box? (Only so much food out there.)

How many of each of the tokens did the class find?

Were there any tokens of the bad smelling foods?

Why weren't there any tokens of those foods?

Discuss the cause-and-effect relationship of finding food and a bear's sense of smell. Ask the students if their questions were answered (go back to where you recorded them before they started the activity). Why were their questions answered or why were their questions not answered?

Elaborate



- Work with the students to create a graph using the tokens that they found.

Use chart paper or a whiteboard to construct the graph. Have students tape the tokens to the graph.

What patterns do you notice in the graph? Discuss which type of food was eaten the most and the least.

Why do bears eat more nuts than berries? (There are more nuts available to eat than berries, they may be easier to find, and they may be easier to get to.)

Discuss if the types of food would change by season. Have students compare that graph with their original predictions. Discuss why it isn't the same.

What do the number of tokens tell us? What does it mean when there are no tokens?

Do these foods really represent what a bear would eat in the winter? (No — they are foods bears would eat in fall or summer.) Why?

Discuss that they may or may not go out to find food, but if they do it is not very often. Discuss how a bear's sense of smell helps it to survive by helping it find food.

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Evaluate

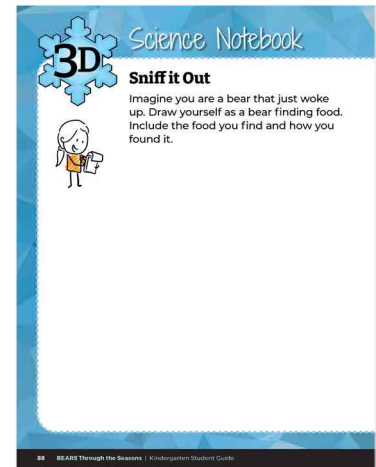


- Have students create a drawing in their student guide in **Science Notebook Sniff it Out** on Page 88. Students will imagine they are a bear and just woke up. They will draw themselves as a bear finding food and include the food they found and how they found it.

Extend



- Read the book *Under the Snow* by Melissa Stewart. Discuss how other Missouri animals look for food. Have students compare differences and similarities that those animals have to bears.



Cross-Curricular Extensions

Discuss what students had for breakfast or lunch. As a class, create a shopping list for getting all these items from the grocery store. Count how many items are on your list. Split your list out by fruits and vegetables, meat, grains, dairy, sweets, drinks, etc. Graph the number of different foods by category.





Take It Home

Dear Family,

We are studying how bears locate food using their senses. With your family helping you, find 6–8 items like spices, flavorings, or seasonings (for example, vanilla extract, rosemary, garlic powder, lemon pepper, etc.). Group the items into two categories — pleasant smells and unpleasant smells. Then, with those same seasonings, spices, or flavorings, have your family recategorize them into what smells good or not so good to them. Discuss why you think one person might like a smell and someone else thinks it smells bad. Why do you think there are differences?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

We are studying how bears locate food using their senses. With your family helping you, find 6–8 items like spices, flavorings, or seasonings (for example, vanilla extract, rosemary, garlic powder, lemon pepper, etc.). Group the items into two categories — pleasant smells and unpleasant smells. Then, with those same seasonings, spices, or flavorings, have your family recategorize them into what smells good or not so good to them. Discuss why you think one person might like a smell and someone else thinks it smells bad. Why do you think there are differences?

Sincerely,

Your Kindergarten Teacher

Token Cut-Outs

Print on cardstock and laminate.



(Pages 144-145) Nuts: ©Owl_photographer/Shutterstock.com; Strawberries: ©harmalini/Shutterstock.com; Raspberries: ©Nitr/Shutterstock.com





Spring

Lessons at a Glance

Suggested Lesson Timeline for Unit 4 Spring

The following lessons are intended to start at the conclusion of Unit 3 in February and conclude by the end of the school year.

- Lesson 4A: 2 hours + additional daily observation time
- Lesson 4B: 2 hours + additional weekly observation time
- Lesson 4C: 1.5 hours
- Lesson 4D: 1.5 hours
- Lesson 4E: 2 hours

Related Reading Texts to Support Unit 4 Content

Lesson 4A:

Rotner, Shelley. (2019). *Hello Spring!* New York, NY: Holiday House. 32 pages. Lexile AD500. ISBN-10: 082343995x.

Lesson 4B:

Hirsch, Rebecca E. (2016). *Plants Can't Sit Still.* Minneapolis, MN: Millbrook Press. 32 pages. Lexile AD510. ISBN-10: 1467780316.

Lesson 4C:

Messner, Kate. (2017). *Over and Under the Pond.* San Francisco, CA: Chronicle Books. 48 pages. Lexile AD660. ISBN-10: 1452145423.

Unit Phenomenon



As the amount of daylight increases and spring begins, food becomes more plentiful. Bears emerge from hibernation and are hungry. It is important for humans to be bear aware during this time.

Essential Statements for Unit 4

- I can identify how plants change their environments to meet their needs.
- I can explain how the amount of daylight changes through the year and how that affects plant growth.
- I can explain how the temperature changes throughout the year.
- I can identify ways to be bear aware and how I can reduce my impact on Missouri wildlife.

Essential Questions for Unit 4

- What do plants need in order to survive?
- How does the amount of daylight and temperature change affect plant growth?
- How can I be more bear aware?

Unit 4 Vocabulary

Aware — noticing something (lesson 4D)

Danger(ous) —able to cause harm; not safe (lesson 4D)

Grow(th) — to become larger (lesson 4A)

Need — something you must have (lesson 4B)

Seasons — different times of year called spring, summer, fall, and winter (lesson 4A)

Spring — a season when plants and trees begin to grow, between winter and summer (lesson 4A)

Sprout — to grow, on a plant this is often seen as a new leaf or flower bud (lesson 4B)

Test — a plan to show what is learned (lesson 4B)



Hello Spring!



Investigative Phenomenon

What do people and animals do in spring that is different than what they do in other seasons?



Estimated Time

Engage: 20 minutes + 10 minutes x 20 days
Explore: 15 minutes
Explain: 30 minutes
Elaborate: 30 minutes
Evaluate: 15 minutes

Missouri Learning Science Standard K-ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time.		Next Generation Science Standard K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.
Science and Engineering Practices (SEP) Analyzing and Interpreting Data Obtaining, Evaluating and Communicating Information	Disciplinary Core Ideas (DCI) Weather and Climate	Crosscutting Concepts (CCC) Patterns Cause and Effect



List of Materials

- Book: *Hello Spring!* by Shelley Rotner
- Chart paper and markers
- 4A Daily Weather Data Chart
- 4A Match Bear Activity to the Season handout
- Student Guide and pencil



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- 4A Link: Missouri Black Bear Story Map
 - 4A Video: *Springtime Animal Behavior*

Engage



- Read the book *Hello Spring!* by Shelley Rotner. Ask the question:

What are the characteristics of spring?

- Read aloud from the student guide, **Unit 4 Bears in the Spring** **Talk About It** on Page 91 and **Read Together Everything is Waking Up!** on Page 93. Looking at the picture, ask students:

What season is this?

How do you know?

Will this season be different for bears? How?

Everything is Waking Up!

Spring is a time for new growth.
Bear cubs are growing.
So is the rest of nature.

Trees start to bloom, and
new plants come up
from the ground.

What new things bloom and emerge in spring?

What temperature outside helps plants to grow?

- It's time to collect our seasonal weather data. As a class, go outside with the student guides to record the temperature and collect weather data. Record findings in the student guide **Science Notebook Recording Weather** on Page 94.
- Refer to the **4A Daily Weather Data Chart** in the following page of this guide. Each day, week, or designated time data is collected as a class, have students record findings on the **Daily Weather Data Chart**. You may post a larger version of this chart to the front of the class. If additional copies are needed throughout the year, photocopies can be made and distributed to students.

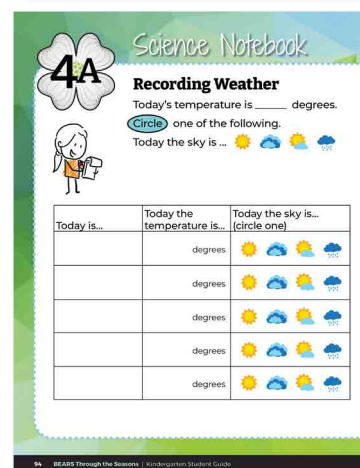
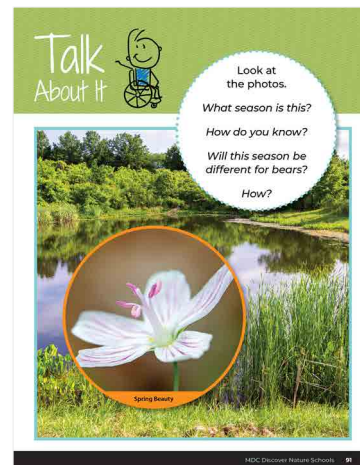
Collect additional data and determine when it will be filled out each day. *How will days that have some rain or some sun be reported?*

Optional — Collect data for 4 weeks. If this option is chosen, continue to use the **Daily Weather Data Chart**, a 4-week data collection tool. Students can draw the weather and record the temperature in the boxes — decide what symbols to use for recording. Ask students why they should all use the same symbols to record. After a week of data collection, discuss how the weather has changed over the course of the week.

Has there been a lot of change or a little change?

Has it occurred fast or slow?

There may be rapid change in weather when storm systems come in. Seasonal changes occur more slowly.



- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- To further their springtime connections, have students open up their student guide, **Draw It! Me in the Spring** on Page 95.

On this page, students will draw a picture of something they like to do in the spring. They need to include what they wear and their surroundings including weather.

Explain



- Use student drawings to create a class poster of spring. Ask students:

What do we wear in the spring?
What are activities that we do in the spring?
Why do we do those activities in the spring?

Elaborate



- Open the *MDC Teacher Portal* to **Kindergarten Lesson 4A**. Refer to the interactive **Missouri Black Bear Story Map**. Show the images of bears emerging from their dens. *What are bears doing in the spring?* (As the weather gets warm and insects become active, bears eat larvae of insects and plants.)
- Watch the *Springtime Animal Behavior* video on the *MDC Teacher Portal* under **Kindergarten Lesson 4A**. Ask students:
What activities are animals doing in the spring?
Why do they do these activities?
How are animals' activities like our activities?
How are they different?
- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate



- Distribute **4A Match Bear Activity to the Season** handout.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Draw It!

Me in the Spring

Draw a picture of something you like to do in the spring.

Cross-Curricular Extensions

Review the senses. We learn about the world as we see, hear, smell, and touch what is around us. Have students make four sections on a piece of paper and in each section, record with words or drawings what they notice around them. Afterwards, make a classroom list of their recordings, listing what they heard, saw, smelled, and touched.

Which list is longest, shortest? Graph these results.



Take It Home

Dear Family,

With your family, take a walk around the neighborhood to search for any types of food a bear may eat after they emerge from their den.

Did you find emerging leaves, ant hills, grasses, or insect larvae?

What else did you find that a bear might like?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

With your family, take a walk around the neighborhood to search for any types of food a bear may eat after they emerge from their den.





















Did you find emerging leaves, ant hills, grasses, or insect larvae?

What else did you find that a bear might like?

Sincerely,

Your Kindergarten Teacher

Daily Weather Data Chart

Today is...	Today the temperature is...	Today the sky is... (circle one)
	degrees	   
	degrees	   
	degrees	   
	degrees	   
	degrees	   

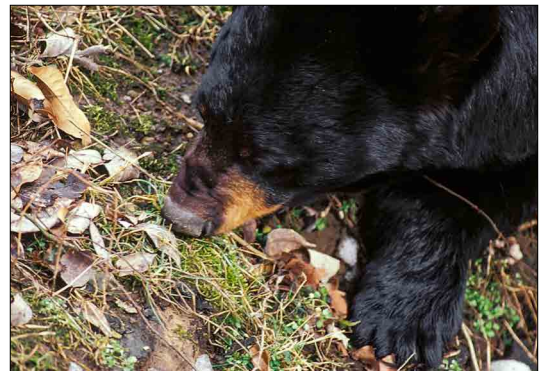
Match Bear Activity to the Season

Draw arrows to match the bear activity to the season.

Spring



Summer



Fall



Winter





Sprouting Seedlings



Investigative Phenomenon

In the spring, animals eat the foods that are available. Trees are budding. Plants are beginning to grow again.



Estimated Time

Engage: 30 minutes
Explore: 15 minutes
Explain: 30 minutes
Elaborate: 30 minutes + 10 minutes x 6 days
(observations once a week)
Evaluate: 15 minutes

Missouri Learning Science Standard

K.LS1.C.1 Use observations to describe patterns of what plants and humans need to survive.

K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and humans can change the environment to meet their needs.

K.ESS3.A.1 Use a model to represent the relationship between the needs of different plants or humans and the places they live.

Next Generation Science Standard

K-LS1-1 Use observations to describe patterns of what plants and humans need to survive.

K-ESS2-2 Construct an argument supported by evidence for how plants and humans can change the environment to meet their needs.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or humans and the places they live.

Science and Engineering Practices (SEP)

Planning and Carrying Out Investigations

Disciplinary Core Ideas (DCI)

Organization for Matter and Energy
Flow in Organisms
Biogeology
Natural Resources

Crosscutting Concepts (CCC)

Cause and Effect



List of Materials

- Book: *Plants Can't Sit Still* by Rebecca E. Hirsch
- Soil and pots for growing seedlings
- Seeds from native plants from MDC, see *MDC Teacher Portal* for details. (Please reserve at least 4 weeks prior to conducting this lesson. Seedlings are available from September to April; reserve early for best selection.)
- Measurement materials (linking cubes, centimeter cubes, or other appropriate measurement tool)
- Student Guide and pencil

Engage



- **Teacher Note:** Teachers should work with their local MDC conservation educator to obtain seeds from native plants for their classroom. Go to the *MDC Teacher Portal Kindergarten Unit Lesson 4B* for ordering, planting, and care information. You will also need soil, pots, and classroom locations to place the trees or plants.
- Read aloud together from student guide **Read Together We All Have Needs** on Page 97.

We All Have Needs

Bears have needs in order to grow.

Do you remember what they are?

Plants and trees have many of the same needs.

- Read the book *Plants Can't Sit Still* by Rebecca E. Hirsch.
- At the beginning of the year, we learned about what animals like bears need to survive. Ask students:

What do animals need in order to live and grow?

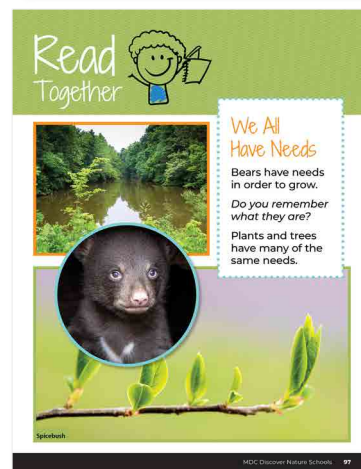
Discuss how animals need food, water, air, and shelter or space.

- Divide students into six groups. Give each group a seed from a native plant. Ask students:

Do plants need the same thing as animals to grow and survive?

How can we help this seedling to grow?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.



Explore



- Ask students:

How can we test our ideas about how to help our seedling grow?

- Groups discuss and draw their ideas to test what plants need to grow. Have them record their ideas on a separate sheet of paper to share with the class.

Explain



- Groups will report out their ideas. They should include water and light. Lead students to designing investigations. You can do this in two groups. Each group will have a variable (either light or water) and a condition that they are responsible for monitoring.

Teacher Note: Create six groups. Three groups can investigate water and three groups can investigate light. For testing water, your conditions can be no water, 1 teaspoon of water, and 1/4 cup of water daily (keeping the soil moist). For testing light, the conditions can be no light, a small amount of sunlight (like under a table or in a corner with little light), and most amount of sunlight (like directly in front of a window).

*How will we determine how much water or light to give the plant?
How will we measure changes? How often will we make observations and measurements? How will we record our observations and measurements?*

Elaborate  **30 MINUTES + 10 MINUTES x 6 DAYS**

- Set up and implement the investigations.

Students will collect data over the period of time teacher sets for this investigation. Students record results in the student guide, **Science Notebook — Seedling Growth and Water** and **Seedling Growth and Light** on pages 98–99.

Students will report and share their findings; all students will record all data from each group's water and light investigation. Ask students:

Based on what we found in our data sheets, what do plants need to grow and survive?

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate  **15 MINUTES**

- In previous units, animal needs have been taught. Have students reflect on this learning to scaffold learning about plants. Create a T-chart comparing plant and animal needs. *How does the availability of needs (light, food, water) affect organisms' ability to survive?* Student responses should serve as basis of evaluation.

Cross-Curricular Extensions

Write and illustrate a story about your growing plant seedling and how it lives day to day. Does it receive what it needs to survive? If so, what will it look like at the end? Is it missing something that it needs? If so, what is it missing and what will it look like at the end of the story?



Science Notebook

4B Seedling Growth and Water

How tall is your plant?

With your group, measure and record the growth of your seed once a week over six weeks.

What measurement tool are you using?
Keep using the same measurement tool each week.

Date	No Water	1 Teaspoon of Water	1/4 Cup of Water

98 BEARS Through the Seasons | Kindergarten Student Guide

Seedling Growth and Light

How tall is your plant?

With your group, measure and record the growth of your seed once a week over six weeks.

What measurement tool are you using?
Keep using the same measurement tool each week.

Date	No Sunlight	Small Amount of Sunlight	Direct Sunlight

99 HOD Discover Nature Schools

What I Notice... <i>What do you see?</i>	What I Wonder... <i>What questions do you have?</i>



Take It Home

Dear Family,

In class, your child has been growing plants and learning about what plants need to survive. They have tested for different amounts of water and light. If you have plants inside your home, explore how much water and light they need. Explore plants in your neighborhood. Can you find some plants that grow under other plants? Can you find plants that live in very dry or very wet locations?

Talk about what plants need and if they all need the same things.

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

In class, your child has been growing plants and learning about what plants need to survive. They have tested for different amounts of water and light. If you have plants inside your home, explore how much water and light they need. Explore plants in your neighborhood. Can you find some plants that grow under other plants? Can you find plants that live in very dry or very wet locations?

Talk about what plants need and if they all need the same things.

Sincerely,

Your Kindergarten Teacher



Tree Takeover



Investigative Phenomenon

In the spring, animals eat the foods that are available. Trees are budding. Plants are beginning to grow again.



Estimated Time

Engage: 15 minutes
Explore: 15 minutes
Explain: 15 minutes
Elaborate: 30 minutes
Evaluate: 15 minutes

Missouri Learning Science Standard

K.LS1.C.1 Use observations to describe patterns of what plants and humans need to survive.

K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and humans can change the environment to meet their needs.

K.ESS3.A.1 Use a model to represent the relationship between the needs of different plants or humans and the places they live.

Next Generation Science Standard

K-LS1-1 Use observations to describe patterns of what plants and humans need to survive.

K-ESS2-2 Construct an argument supported by evidence for how plants and humans can change the environment to meet their needs.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or humans and the places they live.

Science and Engineering Practices (SEP)

Planning and Carrying Out Investigations

Disciplinary Core Ideas (DCI)

Organization for Matter and Energy
Flow in Organisms
Biogeology
Natural Resources

Crosscutting Concepts (CCC)

Cause and Effect



List of Materials

- Book: *Over and Under the Pond* by Kate Messner
- Student Guide and pencil



MDC Teacher Portal Resources

education.mdc.mo.gov/Kindergarten

- 4C Link: Pictures of Plants Changing Their Environment

Engage



- Read *Over and Under the Pond* by Kate Messner.
- Ask students what they noticed in the book. At this point, keep it open-ended.
- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Verify all noticings and record student observations and questions to the chart.

What I Notice... <small>What do you see?</small>	What I Wonder... <small>What questions do you have?</small>

Explore



- Read through the *Over and Under the Pond* book again asking students to focus on the plants.

Ask students:

*What plants does the author highlight or talk about in the book?
Are the plants growing in different places or are they all growing in the same place?*

Explain



- Read aloud from the student guide **Read Together Every Tree Has a Place** on Page 101.

Every Tree Has a Place

Plants and trees have different needs to grow.
Some plants need a lot of water and sunshine.
Other plants may need less.
Do you have different needs than your family?

Think about your yard at home or the schoolyard. Ask students:

Do you notice any of the same plants from the story book we read earlier?

Why are the plants in those locations in the story and not in our schoolyard?

How do the locations match their needs?



Elaborate



- Take students out to the schoolyard. As a group, make observations about where plants are located.

What do you notice about how the plants in the schoolyard meet their needs and change the environment?

Look at specific plants that are in your schoolyard with students. *Are they able to get light and water?* A tree's roots may be breaking up rock or a sidewalk. Its roots are seeking water to meet its needs. Other plants may be growing through cracks in a sidewalk or in rocks.

Note: If you cannot find a place where plants have changed the environment, use the photos in the student guide **4C Tree Takeover** on Page 100.

- Access the *MDC Teacher Portal* **Kindergarten Unit 4C** to display **Pictures of Plants Changing Their Environment**. The roots of all plants move the soil in search of water. Plants also keep soil in place when it rains or the wind blows.

Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate

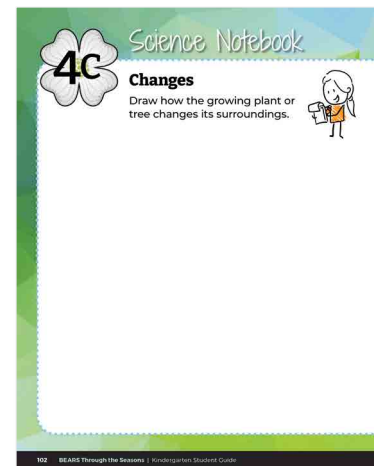
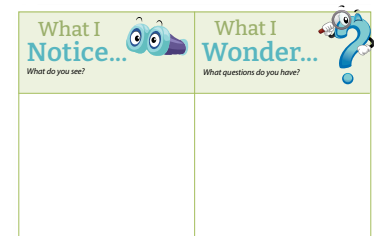
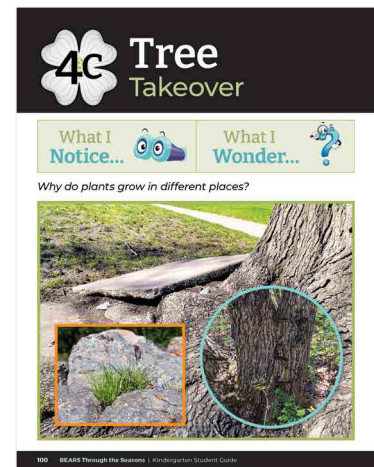
- Display **Pictures of Plants Changing Their Environment** again from the *MDC Teacher Portal*. One image is of a plant or tree growing out of a rock or breaking up a sidewalk. The other image is of a tree on a stream bank where the roots are holding the bank together.

What changes are being made in the environment by the tree or plant?

- Have students to draw one of these images in the student guide **Science Notebook Changes** on Page 102.

In their drawing, have students include any changes made to the surroundings by the plant or tree.

Discuss student drawings, giving each child time to explain the changes made.



Cross-Curricular Extensions

Think about the trees shown in your student guide and when they first sprouted as seedlings 20, 50, or 100 years ago. Interview a family member who is at least 20 years older than you and ask what life was like for them when they were young. How does it compare to today? Share your story with your teacher and classmates.





Take It Home

Dear Family,

Trees can grow in many locations. Take a walk and notice the many types and places trees grow in your neighborhood. As you see various trees discuss the following questions.

Are all the trees the same size? Which do you think are younger trees and older trees? How did trees get here? Do you think people planted the trees? Do you think tree seeds grew on their own? What do you see that makes you think what you do?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Trees can grow in many locations. Take a walk and notice the many types and places trees grow in your neighborhood. As you see various trees discuss the following questions.

Are all the trees the same size? Which do you think are younger trees and older trees? How did trees get here? Do you think people planted the trees? Do you think tree seeds grew on their own? What do you see that makes you think what you do?

Sincerely,

Your Kindergarten Teacher



Sunshine Days



Investigative Phenomenon

I cannot play outside after dinner during the winter because it's dark, but I can during the summer because it's still light outside.



Estimated Time

Engage: 15 minutes
Explore: 20 minutes
Explain: 15 minutes
Elaborate: 30 minutes
Evaluate: 15 minutes

Missouri Learning Science Standard ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.		Next Generation Science Standard <i>NGSS First Grade: 1-ESS1-2</i> Make observations at different times of the year to relate the amount of daylight to the time of the year.
Science and Engineering Practices (SEP) Planning and Carrying Out Investigations Developing and Using Models	Disciplinary Core Ideas (DCI) Earth and the Solar System	Crosscutting Concepts (CCC) Patterns



List of Materials

- 4D Average Daylight Length (Hours) by Season Data Table
- 4D Average Daylight Hours per Season Answer Key
- Sticky notes in four different colors
- Chart papers for large graphs
- Student Guide and pencil



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- 4D Different Seasons, Same Times Photos

Engage



- Read aloud from the student guide, **Lesson 4D Talk About It** on Page 105.

Look at the photo.

Is this a photo of summer or winter?

Is it daylight or dark?

Is it darker at the same time of day in winter?

Discuss image of kids playing outside in the summer. Ask students:

Can you play outside after dinner in the winter? Why not?

Does it get dark sooner or later in winter?

- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.



Explore



- Use **4D Average Daylight Length (Hours) by Season Data Table** (the average number of daylight hours for each season.) Partner students and give each partner set a color of sticky notes that corresponds to the season of the month they are graphing (example: summer=yellow, fall=orange, winter=blue, spring=green).
- Tell students that they are to count out the number of sticky notes for the number of daylight hours for their assigned season. You can give them a sticky note with the season name on it and the number of average daylight hours to place as a label for the x-axis. Each group will stack the sticky notes as a bar graph for their season over the season label. When complete, there will be a class graph of the average number of hours of daylight in each season. Reference **4D Average Daylight Hours per Season Answer Key**.



Explain



- If the graphs for each season are on different chart paper, put them together to make a graph showing the year. Discuss the patterns for the seasons. Ask students:

What do you notice about the length of days throughout the year from season to season?

Discuss with students that these patterns repeat each year.

Elaborate



- Student will graph the data for the seasons into their student guide on **Science Notebook What Does Our Graph Say?** on Page 106. Ask these questions:

What do you notice about the average length of days in each of the seasons?

How does this affect what we do after school in the different seasons?

How does this pattern of changing daylight and changing weather affect plant growth during the year?

- Turn student guides to **Lesson 4B Sprouting Seedlings**. Discuss:

What was the effect of little to no sunlight on the seedling? What happened to the seedling? What was the effect of more sunlight?

- Look back at the **Temperature Data Sheets** collected throughout each season in lessons 1B, 2A, 3A, and 4A. Compare the dates that you collected your data to the amount of sunshine for that season.

How does the weather you saw affect plant growth? How did the temperature change each season? How did the weather change?

- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.

Evaluate



- From the *MDC Teacher Portal*, display **4D Different Seasons, Same Times** photos. These pictures were taken at the same time in the same location, but in different seasons. Students will Think-Pair-Share and identify which of the images is in the winter season and which is in the spring. Share reasons with the class.

Cross-Curricular Extensions

Make an acrostic poem using the letters S, U, N and relate the descriptive words to describe the longer daylight hours in the spring.



Science Notebook

4D

What Does Our Graph Say?

What season has the **most** daylight hours? _____

What season has the **least** daylight hours? _____

15				
14				
13				
12				
11				
10				
9				
8				
7				
6				
5				
4				
3				
2				
1				
	Summer	Fall	Winter	Spring

106 BEARS Through the Seasons | Kindergarten Student Guide

Science Notebook

4B

Seedling Growth and Water

How tall is your plant?

With your group, measure and record the growth of your seed once a week over six weeks.

What measurement tool are you using? Keep using the same measurement tool each week.

Date	No Water	1 Teaspoon of Water	1/4 Cup of Water

108 BEARS Through the Seasons | Kindergarten Student Guide

Seedling Growth and Light

How tall is your plant?

With your group, measure and record the growth of your seed once a week over six weeks.

What measurement tool are you using? Keep using the same measurement tool each week.

Date	No Sunlight	Small Amount of Sunlight	Direct Sunlight

MDC Discover Nature Schools 99

<p>What I Notice...</p> <p>What do you see?</p>	<p>What I Wonder...</p> <p>What questions do you have?</p>



Take It Home

Dear Family,

Your child is learning about the length of daylight in each season and how that affects the growth of our plants. Take a walk around your neighborhood each day this week and observe the different plants beginning to emerge with the longer daylight. Do you see a difference in the growth of plants at the beginning of the week versus at the end of the week?

Sincerely,

Your Kindergarten Teacher



Take It Home

Dear Family,

Your child is learning about the length of daylight in each season and how that affects the growth of our plants. Take a walk around your neighborhood each day this week and observe the different plants beginning to emerge with the longer daylight. Do you see a difference in the growth of plants at the beginning of the week versus at the end of the week?

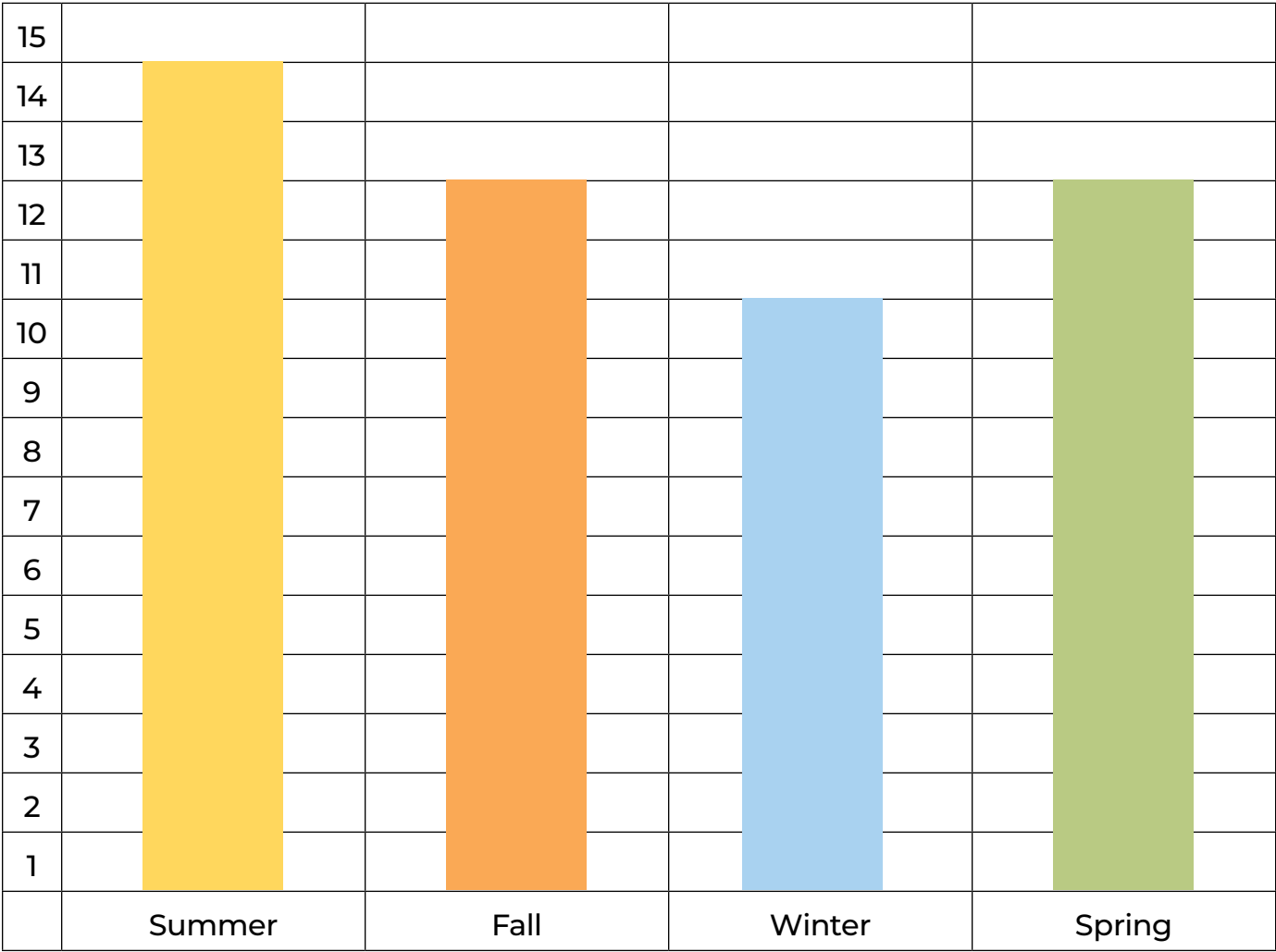
Sincerely,

Your Kindergarten Teacher

4D Average Daylight Length (Hours) by Season Data Table

Summer	14
Fall	12
Winter	10
Spring	12

4D Average Daylight Hours per Season Answer Key





Hungry, Again!



Investigative Phenomenon

Bears may look for food in places close to where humans may live.



Estimated Time

Engage: 15 minutes
Explore: 30 minutes
Explain: 15 minutes
Elaborate: 30 minutes
Evaluate: 30 minutes

Missouri Learning Science Standard K.ESS3.C.1 Communicate solutions that will reduce the impact of humans on the land, water, air, and or living things in the environment.		Next Generation Science Standard K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air and/or other living things in the local environment.
Science and Engineering Practices (SEP) Obtaining, Evaluating and Communicating Information	Disciplinary Core Ideas (DCI) Human Impacts on Earth Systems	Crosscutting Concepts (CCC) Stability and Change



List of Materials

- Student Guide and pencil



MDC Teacher Portal Resources

- education.mdc.mo.gov/Kindergarten
- 4E Link: *Diary of a Black Bear* in the August/September 2010 issue of *Xplor*
 - 4E Video: *Be Bear Aware*

Engage



- Reference student guide, **Lesson 4E Hungry, Again!** on Page 108.

Ask students:

Why is the bear getting into the trash?

- Read aloud from the student guide **4E Hungry, Again!** introduction and the **Read Together Bear Aware Song** on pages 108–109.

Bear Aware Song

Be bear aware, be bear aware
Yes, you should care, how they fare.
Don't leave the garbage lying all around
In places where a bear might be found.
Be bear aware, be bear aware.

- Discuss the **Talk About It** questions with the class.
Do bears ever come out of the woods?
Why might bears do this?
Could this be unsafe to bears and to people? How?
- Prepare and display your **Noticings and Wonderings Chart** for this lesson. Add student observations and/or questions to the chart as the lesson proceeds in reference to the phenomenon studied.

Explore



- Read aloud the September 19 section of *Diary of a Black Bear* in *Xplor* magazine August/September 2010 issue, Page 13. (Access link to on *MDC Teacher Portal Kindergarten Unit 4D*.)

Ask students:

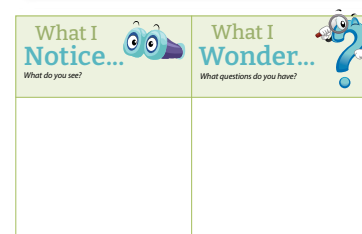
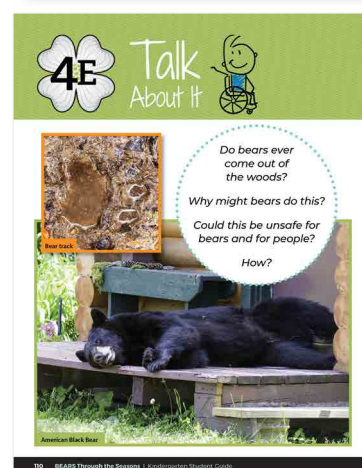
What does the bear eat in springtime? (Bears eat plants, acorns, and insect larvae)

Why do the bears eat the foods they eat in springtime?

Where can a bear find food?

Draw their attention to the dog food on the porch in the entry. The bear was hungry and looking for food.

Ask students: *How else do humans provide food unintentionally for bears?* Have students brainstorm their thoughts and add them to the **Noticings and Wonderings Chart**.



Explain



- Discuss how people can change a bear's habitat. When humans live near bears, they may not realize they are providing food that a bear may find. Bears will use their strong sense of smell and find food around homes. Bird feeders, pet food, compost, fruiting plants, or garbage all have strong smells that can attract a bear. MDC encourages people to remove all food sources that may be attracting black bears. Watch the MDC *Be Bear Aware* video available on the *MDC Teacher Portal*, **Kindergarten Unit Lesson 4D**.

Elaborate

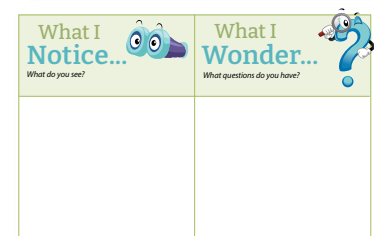


- In their student guide on the **Draw It! Be Bear Aware** page, students will draw themselves being bear aware. Share and discuss the drawings with the class.

Then, in partners or as a group, have students create a poster about solutions to human impact on their environment making them more "bear aware." Teacher may assign one situation to each group or have each group decide which situation to use to inform people.

Potential Situations:

- Bear comes onto porch at night smelling food from outdoor grill
 - Bear takes bird feeders from pollinator garden area
 - Bear visits beehives that a local homeowner is keeping
 - Bear visits campsites in a state park when food is not put away
 - Bear digs into garbage cans around a neighborhood
 - Bear finds dog food that was left outside.
- Add student observations and/or questions to the **Noticings and Wonderings Chart** as the lesson concludes in reference to the phenomenon studied.



Evaluate



- Students present their poster to the class or to another group. They need to include in their presentation how humans changed the environment.

At the conclusion of the presentations, each student receives a *Be Bear Aware* sticker and recites the following **Bear Aware Pledge**:

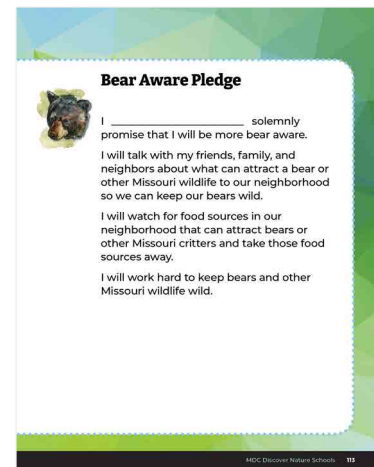
I _____ (name stated) solemnly promise that I will be more bear aware.

I will talk with my friends, family, and neighbors about what can attract a bear or other Missouri wildlife to our neighborhood so we can keep our bears wild.

I will watch for food sources in our neighborhood that can attract bears or other Missouri critters and take those food sources away.

I will work hard to keep bears and other Missouri wildlife wild.

- **Optional:** *Be Bear Aware* or *Be BearWise* stickers may be available at your local Missouri Department of Conservation office. Contact your local MDC conservation educator first for sticker availability. Access the *MDC Teacher Portal* for more *Bear Aware* or *BearWise* Resources on the **Kindergarten 4E Teacher Page** and for your MDC conservation educator contact information.



Cross-Curricular Extensions

After taking the **Bear Aware Pledge**, have students talk about how they would talk to a friend or neighbor about what it means to be more bear aware. Discuss that some people may not agree with them. How do we talk out our disagreements? The teacher can role-play someone who disagrees with their group poster and the situation regarding black bear practices (for example, "I like my bird feeders up because I enjoy my birds," or, "I like to grill out almost every night in the summer.")





Take It Home

Dear Family,

Ask your child to share their poster points with your family. Find ways to make your own home more bear or wildlife aware. With your child, take a walk around your neighborhood and see if there are other foods that a bear may like. What would you both do to remove those sources or how would you make a change?

Sincerely,

Your Kindergarten Teacher



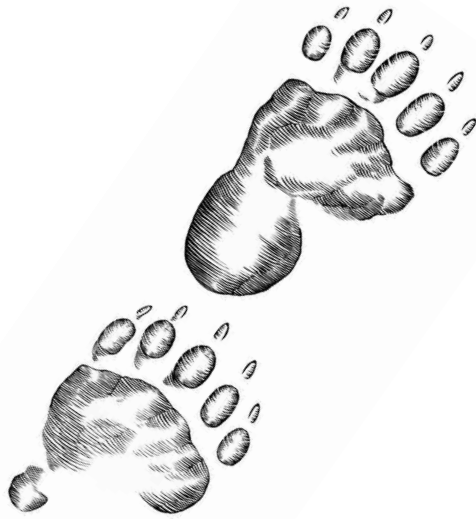
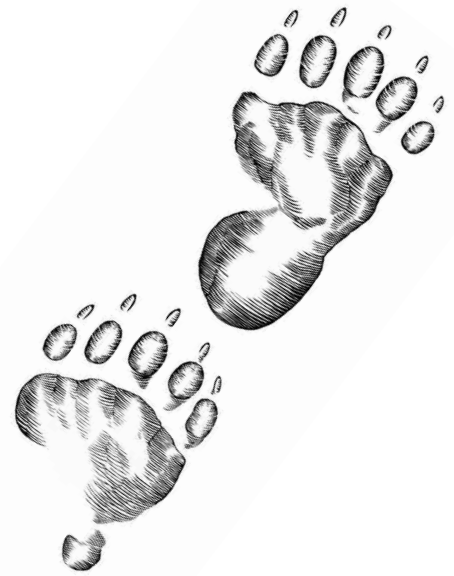
Take It Home

Dear Family,

Ask your child to share their poster points with your family. Find ways to make your own home more bear or wildlife aware. With your child, take a walk around your neighborhood and see if there are other foods that a bear may like. What would you both do to remove those sources or how would you make a change?

Sincerely,

Your Kindergarten Teacher





Black Bear Graduation

The last student guide entry is **Lesson 4E Draw It! A Bear-y Happy Ending** on Page 112.

After reviewing work in their student guide, students can draw their favorite lesson, activity, or learning nugget on this page.

Explain to students that they will be graduating from Black Bear Cubs to Black Bear Yearlings!


At the conclusion of this entire Black Bear Science Unit, have a Bear Party! The students should wear their bear paws (black crew socks), and bear

headbands. Play graduation music and distribute the **Black Bears of Missouri Certificate**. Copy and sign the certificate template following this page. You can also visit the *MDC Teacher Portal* Kindergarten Unit Graduation for the **Black Bears of Missouri Certificate**.



Present each Black Bear Cub with their certificate and tell them they are now yearlings and can survive on their own with the knowledge they learned through the year.


Congratulations to our Black Bear Yearlings on a job well done!




Draw It!

A Bear-y Happy Ending

Happy Graduation! Let's review what you learned this year. Flip back through your student guide and draw your favorite bear lesson or activity.





Bear Aware Pledge

I _____ solemnly promise that I will be more bear aware.

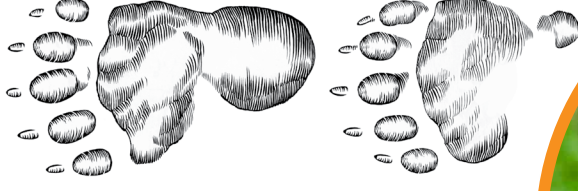
I will talk with my friends, family, and neighbors about what can attract a bear or other Missouri wildlife to our neighborhood so we can keep our bears wild.

I will watch for food sources in our neighborhood that can attract bears or other Missouri critters and take those food sources away.

I will work hard to keep bears and other Missouri wildlife wild.

Congratulations!

You have completed a one-year study on Missouri Black Bears and
will now graduate from a bear cub to a bear yearling!

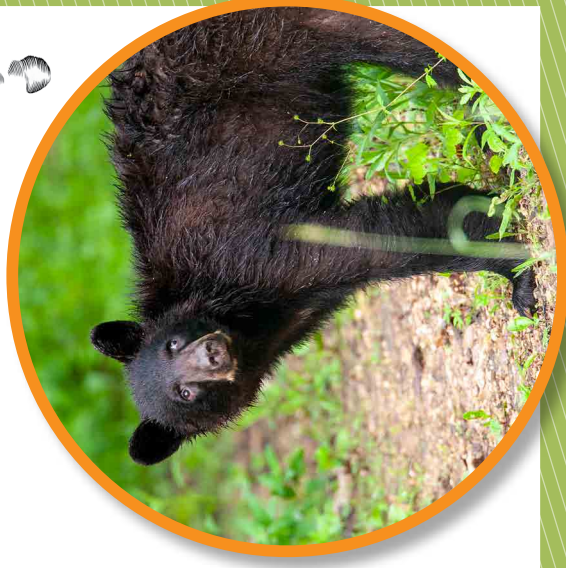


This certificate is presented to:

Date:

Kindergarten Teacher:

School Name:



Appendices

Field Experience Guidance

The goal of the field experience is to take learning outside and provide students the ability to explore and discover in the real world. Since the Kindergarten Unit is focused on black bears, this is an opportunity for students to apply the David Sobel principle of animal allies and become black bears as they explore the world through the lens of a bear cub.

To facilitate this, consider taking students to a forested area that has components of black bear habitat. Students can seek out the habitat elements bear cubs must find in their habitat. Based on the seasonal nature of this curriculum, students can fully understand the abundance of acorns in the fall or seek out a den site to sleep through the winter.

Here's a sample of activities students may engage in:

- Looking for a place a bear may choose as a den
- Pushing and pulling logs as they look for sources of food (address safety considerations)
- Drawing pictures of the types of food a bear might eat, count number of items (acorns)
- Looking for places a bear could get a drink, including puddles

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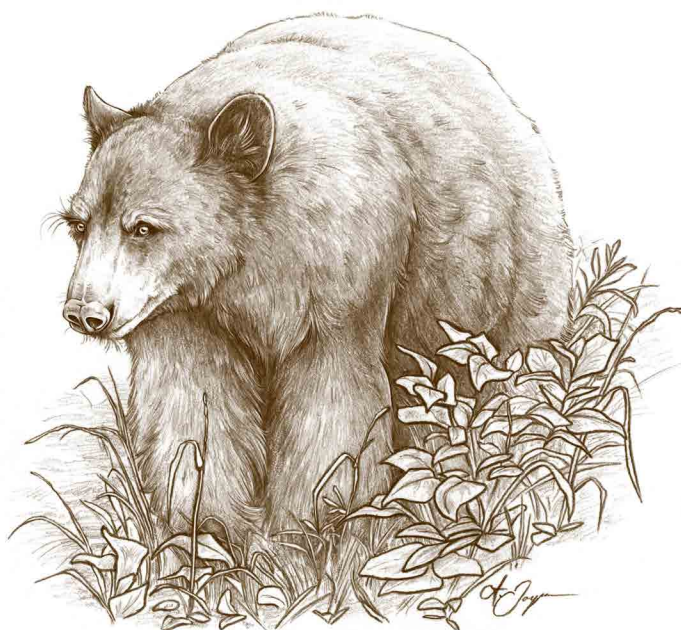
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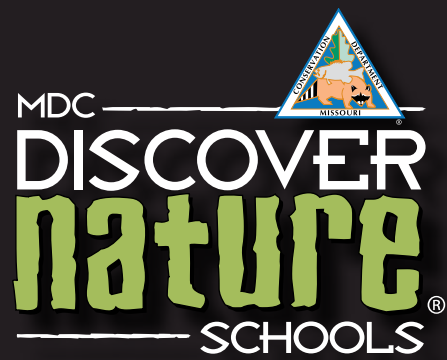
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